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Date: 31/01/2020
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Application for a Development Consent Order for the Thanet Extension Offshore Wind Farm (EN010084).

Dear Ms Mignano,

We write in response to the letter dated 21 November 2019 from the Department for Business, Energy and Industrial Strategy ('the Secretary of State').

Marine Navigation, Shipping and Ports Infrastructure

The Applicant has provided comments on the responses submitted by Interested Parties (IPs) on the Collision Risk Model and 2019 Pilot Transfer Bridge Simulation in Annex A and Annex B. A final summary position on shipping and navigation, taking into account the conclusions of the 2019 PTBS and the latest responses from IPs is submitted in Annex C.

Changes to the DCO

Comments on the responses from IPs on the draft DCO are set out in Annex D to this letter.

Compulsory acquisition

The Applicant has continued negotiation with Ramac (Holdings) Limited. Both parties continue to work to close out the remaining open items on the contractual documentation.

Fish spawning

Following submissions made to the Secretary of State on 11 December 2019, the Applicant has discussed the need for timing restrictions with the MMO and Cefas.

The Applicant has agreed with the MMO that, following the presentation of additional noise modelling outputs, there is no requirement for timing restrictions for Thames herring stock or Sole spawning. The outputs were based on modelling the worst case 5000kJ hammer energy

This agreement is also on the basis that piling will not take place within the Structures Exclusion Zone (SEZ). The DCO and dMLs limit works within the SEZ, ensuring that works

no.1 and no.2 cannot be constructed in this area. These works cover the only offshore piling activities and therefore secure that no piling can be undertaken in the SEZ.

Whilst the Applicant does not consider it necessary, should further clarity on the restriction of piling in the SEZ be required, Requirement 6 could modified to refer explicitly to percussive piling as follows:

6.—(1) None of the infrastructure listed in Work No.1 (a) to (c), Work No. (2), nor Ancillary Works (a), (c) and (d) may be installed and no percussive piling carried out within the structures exclusion zone, whose coordinates are specified below—

It has also been agreed with MMO that the timing restriction for Downs herring stock should remain for the time being, subject to future discussions. Both parties recognise that there is potential to reduce this timing restriction following review of further data, but that the requested presentation and review of this data will not happen prior to 31 January 2020.

The condition as proposed by the Secretary of State allows for variation of the timing restriction, with approval of the MMO, and the Applicant is satisfied that the opportunity for further productive discussions on the Downs herring stock remains.

Saltmarsh Mitigation

The Applicant understands, following discussions with Natural England, that they and the Environment Agency are in agreement with the Applicant's position on saltmarsh mitigation drafting, as set out in the response letter to the Secretary of State dated 13 December 2019.

We trust that this response and the enclosed annexes are of assistance to the Secretary of State and would be grateful if this letter and enclosures could be passed to BEIS.

Yours sincerely

[redacted]

Daniel Bates
Consents Manager – Thanet Extension Offshore Wind Farm
Vattenfall Wind Power Ltd

Enclosed:

Annex A – Comments on shipping and navigation responses
Annex B – Point by point comments on responses to the Secretary of State
Annex C – Final summary position on shipping and navigation
Annex D – Comments on responses on the draft DCO

Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex A – Applicant's comments on Interested Party shipping and navigation responses

Submitted by Vattenfall Wind Power Ltd

Date: 31st January 2020

Revision A

Drafted By:	Vattenfall Wind Power Ltd
Approved By:	Daniel Bates
Date of Approval:	31st January 2020
Revision:	A

Revision A	Original Document submitted to the Planning Inspectorate
N/A	
N/A	
N/A	

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Figures

1 Introduction

1.1 Background

1 On the 21st November 2019 the Secretary of State issued a request for further information and comments on the Thanet Extension application (EN010084). Responses to this request were subsequently made available on the 13th December 2019.

2 This document has been drafted in response to the Secretary of State's invitation to comment on the responses, which was issued on the 6th January 2020.

1.2 Document Structure

3 This document relates solely to responses submitted in relation to shipping and navigation matters. The document is structured to address the responses submitted by IPs, and where possible reflect the Secretary of State's November 2019 request for further information, as follows:

4 Navigation Risk Assessment – provides the Applicant's comments on responses submitted with regards the independent collision risk assessment undertaken at Deadline 6.

5 Further Navigation Simulation report – provides the Applicant's comments on responses received with regards the 'Thanet Extension Offshore Wind Farm: HR Wallingford Bridge Simulation Report' (2019 PTBS) which considered whether there is sufficient sea room in the vicinity of the proposed Development to enable marine navigation and pilotage to continue safely. The 2019 PTBS was submitted to the Planning Inspectorate following the close of examination.

2 Response to matters relating to CRM

2.1 Summary of IP observations

6 The Secretary of State invited views from Trinity House, Maritime and Coastguard Agency, UK Chamber of Shipping, London Pilots Council, Port of Tilbury, London Gateway Port, Port of Sheerness, London Medway Ports, Port of London Authority and Estuary Services Limited, and any other Interested or Other Parties. The following IPs provided responses on the CRM:

- Port of London Authority (PLA) and Estuary Services Limited (ESL);
- Chamber of Shipping;
- Maritime and Coastguard Agency (MCA);
- Trinity House;
- Port of Tilbury London Limited and London Gateway Port Limited (PoT/LG)

7 The observations relate to the definition of material damage, use of AIS data, Under Keel Clearance, transit deviation assumptions, comparability with other offshore wind farm applications, and future baseline and baseline vessels.

2.2 Applicant response

8 The Applicant's comments on individual points raised by the IPs are presented in Annex B to this submission to the Secretary of State. The following sections provide a response to the primary themes from IP responses.

MAIB data and definition - Material damage

9 The MCA note in their response that they are content with the Marine Accident Investigation Branch (MAIB) data. In contrast the PLA/ ESL state that the MAIB definitions allow for low level incidents to be filtered from the CRM. However, focusing specifically on vessel to vessel material damage allows consideration where 'the structural integrity, performance or operational characteristics of the ship or infrastructure are significantly affected and requires major repair or replacement of a major component or components'.

10 The independent CRM study deliberately excludes minor contact with no damage to ensure the model is reliably calibrated and that outputs can be benchmarked against other studies. Minor incidents are more likely to go unreported. Therefore to include only reported minor incidents would distort the results. Using incidents where at least one vessel suffered material damage provides a reliable dataset and therefore a reliable assessment of collision risk.

Use of AIS data

11 MCA are in agreement with the general use of data, although MCA, TH, Chamber of Shipping and the PLA/ESL also highlight the absence of non-AIS vessels from the collision risk analysis. The Applicant recognised the limitations of a month of AIS data, although entirely EIA and MGN543 compliant and undertook site specific surveys which were also MGN compliant. In addition, a further 18 months of data were also subject to analysis and confirmed the initial baseline, inclusive of the AIS and non-AIS data elements to be appropriate, representative of existing conditions, and adequate for the purposes of EIA, NRA and CRM.

12 For the Deadline 6 CRM, the September 2017 period was not only representative of vessel density and type, but also representative of wind strengths across the spectrum of conditions experienced, inclusive of Storm Eileen (60 knot wind)). As such whilst the Applicant accepts that the collision risk analysis relies on September AIS data, the lack of non-AIS data does not materially alter the conclusions of the analysis, or the baseline data on which the conclusions were drawn.

Technical assumptions (UKC and deviation)

13 The PLA/ESL note that when a vessel is required to deviate from its preferred course, the under-keel clearance, and deadweight is a significant factor in determining collision risk and manoeuvrability. The Applicant can confirm that the model employed in the second CRM takes vessel size in terms of both deadweight and draught/under keel clearance into account.

Comparability with other offshore wind farms

14 IPs have questioned the comparison made in the CRM report with other projects and CRM exercises. The Applicant accepts, and has made clear in the report, that each project has its own nuances but this does not alter the conclusions of the report. The change in values for other projects are used as an illustrative comparison to demonstrate that, regardless of baseline conditions, changes to density, routeing and risk can be mitigated to enable successful co-existence and projects consented accordingly.

Future growth

15 A criticism of the CRM is the use of a 10% future baseline. PoT/LG state that this is insufficient to account for future traffic growth. A key tenet of the submission is that whilst the proposed 10% future baseline may appropriately represent the growth in port throughput for the UK as a whole, it is not reflective of the ports located in the Thames Estuary. Reliance has been placed on predictions that vessel freight may increase over the planning horizon by more than 10%. At Deadline 7 (REP7-026) the Applicant submitted a detailed analysis of past and future vessel traffic predictions through reference to Department of Transport data; this has not been referred to in the PoT/LG recent submission. To summarise the Applicant's position, an increase in vessel freight, in an environment where larger vessels and concomitant economies of scale are driving innovation, should not be confused with an increase in vessel movements. There is an absence of linear correlation, between the two parameters.

16 The theme of future traffic is addressed in detail in section 3.2 where the detailed analysis concludes the future baseline of vessel density of 10% to be reflective of other published forecasts and based on more recent statistical analysis than the MMO forecast. Of importance in terms of policy and anticipated growth is the recognition in the Government's Maritime 2050 Vision that global trends are for the design and construction of larger ships, and the DfT 2018 and 2019 port freight forecasts which conclude growth in traffic is being driven by unitised freight traffic, with short term growth offset by decreases in other freight types. The DfT 2019 port freight statistics also identify that bulk traffic is continuing a long term decline, however the statistics also identify that unitised traffic declined in 2018 following a 5 year period of growth. The longer term analysis presented in the 2018 and 2019 statistics notes that overall tonnage has declined 4% since 2009, with an exception being London which saw tonnage increase by 7%. This was attributed to London Gateway but did not result in an increase in vessel arrivals which had remained broadly similar to previous years.

17 Given unitised container vessels represent the core growth area, and general cargo will continue to decrease as freight is increasingly containerised, the multiple DfT reports and forecasts clearly indicate the direction of travel is for increased freight tonnage, but with a shift towards larger vessels. The DfT 2018 and 2019 port freight statistics reports conclude under vessel arrivals that *'Since 2010, the number of cargo vessels arriving at UK major ports has fallen overall, whereas the total deadweight tonnage arriving has remained broadly stable - reflecting an increase in average vessel size, particularly for container ships.*'. This is also reflected in the Applicant's analysis which demonstrates fluctuations on vessel freight (tonnage) do not have a linear relationship with vessel arrivals. This is particularly of note for the Port of London which, as identified in the 2018 statistics, enjoyed an increase in tonnage attributed to a notable increase in 40 foot containers, but did not result in an increase in vessel arrivals.

3 Response to matters relating to the further Navigation Simulation Report

3.1 Summary of IP observations

18 As with the request for responses on the CRM, the Secretary of State invited responses on the 2019 PTBS from Trinity House, Maritime and Coastguard Agency, UK Chamber of Shipping, London Pilots Council, Port of Tilbury, London Gateway Port, Port of Sheerness, London Medway Ports, Port of London Authority and Estuary Services Limited, and any other Interested or Other Parties. The following IPs provided responses on the 2019 PTBS:

- Port of London Authority (PLA) and Estuary Services Limited (ESL)
- Chamber of Shipping;
- Maritime and Coastguard Agency (MCA);
- Trinity House;
- Port of Tilbury London Limited and London Gateway Port Limited (PoT/LG)

19 The observations relate primarily, though not exclusively, to the following themes.

- Attendance/ Independence;
- Adequate number of scenarios;
- Not reflective of local operations;
- Qualitative analysis;
- Future baseline;
- Quality of consultation; and
- Conduct of simulations;

20 These themes are addressed below.

3.2 Applicant response

Attendance/ Independence

21 The responses received from PLA/ ESL and PoT/ LG, and to a lesser degree MCA and Trinity House identify a challenge for any study such as this, which is to ensure independence whilst retaining familiarity. Both PLA/ ESL and PoT/ LG consider that local operators should have taken part in the simulation to ensure that local conditions and existing operations could be replicated. In contrast, the MCA, and Trinity House in particular, note the importance of independence to investigate the ability of mariners that are not familiar with the area. It is the Applicant's view that independent mariner participation, in a simulation for which the scenarios were subject to rigorous consultation prior to the simulation itself, offers the best opportunity to incorporate both local knowledge and independence.

22 Specifically with regards the ability of IPs to attend, the Applicant provided a comprehensive record of the consultation and liaison undertaken by the Applicant prior to the 2019 PTBS within the report. The consultation record identifies that there was 3 months consultation leading up to the simulation, inclusive of the commitment made by the Harbour Master (Lower) for PLA and a PLA pilot to attend the simulation in September 2019. With regards the feedback received from ESL on the 2019 PTBS the Applicant can confirm that ESL did not contact the Applicant other than a short email on 2nd August, the communication records confirm that the Applicant called ESL on two occasions following their withdrawal from the simulation to seek a solution to their attendance. The Applicant did not state or request two members of ESL to attend for every day of simulation, this was a self-imposed restriction that ESL set. The Applicant confirmed to ESL that even attending for 1 day could be beneficial (as was the case with other IPs who attended a small number of days) and there is no doubt that many of the issues raised in ESLs response relating to metocean conditions, lees, ladder assignment etc could have been discussed with the independent mariners during one day of attendance. The Applicant is not aware of any similar reason for PLA's non-attendance which (given their local knowledge) could have also contributed to these discussions. Whilst the Applicant recognises that consultation and liaison on the project has been extensive and demanding on PLA/ ESL resources the criticisms on the simulation appear principally related to their non-attendance, despite the Applicant doing everything it could to facilitate that attendance and participation.

23 Most importantly it must be noted that both the 2017 PTBS, which was conducted with full PLA pilot and ESL coxswain participation, and the 2019 PTBS conducted with independent mariners, reached the same conclusions, i.e. that pilotage remains safe and unimpeded in any significant capacity as a result of the proposed project. This conclusion should also be seen in the context that the 2017 PTBS was undertaken with a more extensive project boundary that was subsequently reduced.

24 In conclusion it is the Applicant's position that whilst regrettable that PLA and ESL were unable to attend in person, the conclusions of the 2019 PTBS remain robust, and weight can be placed on the use of independent mariners. Given the extensive consultation on the specification of the 2019 PTBS, during and after Examination, and the comments received on the perceived flaws of the PLA hosted 2017 PTBS, whilst attendance on the day would have been welcomed by the Applicant it cannot be said that IPs have not been afforded adequate and reasonable opportunity to inform the simulation and indeed, attend. The conclusions of the navigation simulations, both with and without the participation of local expertise, remain the same; that pilotage can continue safely without any significant impediment to existing operations.

Adequate number of scenarios

25 PLA/ ESL question whether the number of simulation runs is adequate. As identified on page 39 of the 2019 PTBS HR Wallingford, recognised by all parties as a leading provider and undertaker of navigation simulation in Europe, confirmed that the 41 runs and 159 pilot transfers over seven days of simulation was considered adequate to meet the study objectives. The critical objectives were –

- Test a range of scenarios across all areas of the NE Spit pilotage area which considered metocean conditions, traffic levels and concurrent transfers;
- Receive feedback from experienced independent mariners and pilots unfamiliar with the area to inform the running of and results from the simulation;
- Conclude from the outcomes of the PTBS whether any issues arise that may require an update to the Navigation Risk Assessment Addendum (REP5-039) as submitted in examination.

26 PLA/ ESL identify that the expectation of the organisations is that at least 100 runs should be simulated to provide a representative assessment of an acceptable range of weather and tidal conditions, vessels, day/ night, passing traffic, human factors and scenarios. It is worthy of note that the specification highlighted a minimum number of scenarios that would be run to explore all agreed parameters, it was not capped. In practice the simulation was extended from the initial five days by a further two to ensure that all scenarios had been adequately investigated. This position was, as has been identified in both the 2019 PTBS report and in paragraph 15 of this final response, agreed by HR Wallingford confirming that the 41 scenarios (159 individual vessel runs/pilot transfers) was adequate to meet the objectives of the study.

27 It is also worthy of note that the number of scenarios focuses on limit states, i.e. those metocean conditions that would be considered to be at the limit not only of operating conditions but importantly at the limit of conditions experienced in the inshore route and wider region. In this context 159 pilot transfers, in wind conditions generally >25 knots and frequently with simulated significant wave height of 2m, can be considered to provide a comprehensive analysis of the risks associated with the largest vessels, under the busiest traffic conditions, in limit state metocean conditions.

28 The limit state nature of the simulations with regards traffic conditions is evidenced by reference to the AIS animations, which provide graphical representation of the busiest 24hr periods recorded during a 12 month period. Figure 2 provides a 'screen grab' of the busiest 24hr period for pilotage (Annex A, Appendix 5 to Applicant's Deadline 8 submission), and is directly comparable with the scenarios simulated noting that the simulation compressed this traffic into a 1hr period (Figure 1). It can be seen that the number of vessels and their proximity around the NE Spit pilot diamond and the inshore route in general is comparable, although more vessels are present in the simulation (Figure 2), emphasising the precautionary nature of the PTBS.

29 The limit states with regards vessel sizes is clearly evidenced by the simulation of a range of vessels inclusive of those recognised by all parties as not currently using the inshore area, but which may potentially, under specific conditions, use the area in the future.

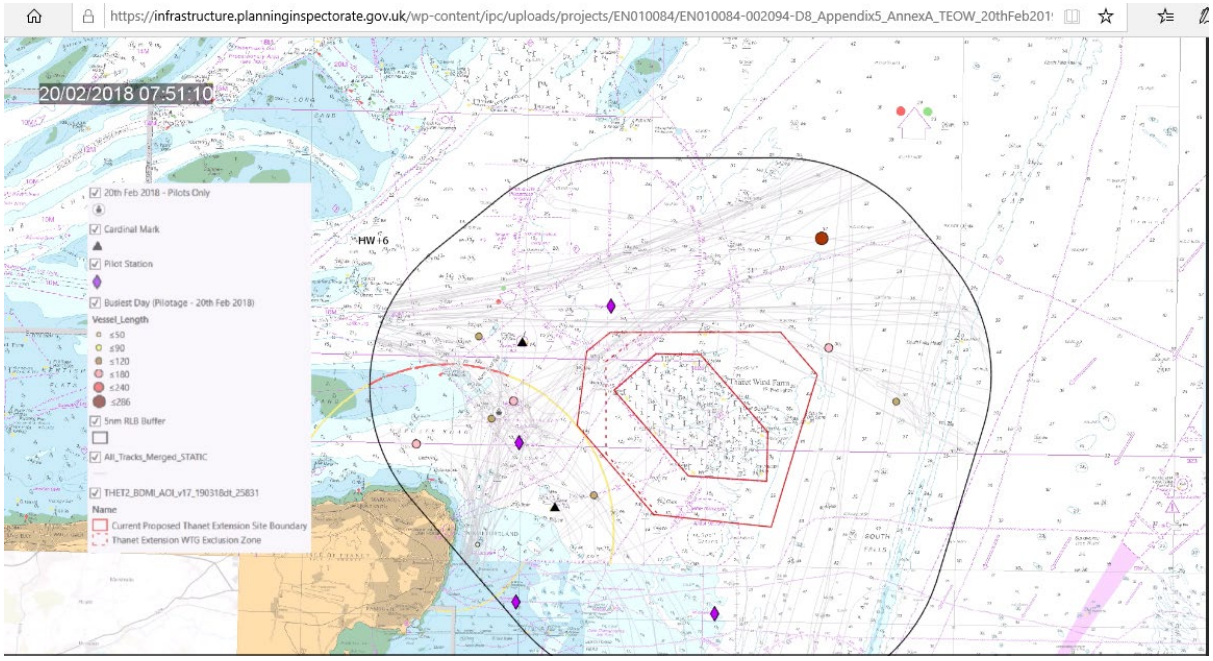

Figure 1 Representative 'screen grab' derived from the 'pilotage' busiest day animation (Annex A to Appendix 5 of the Applicant's Deadline 8 submission)

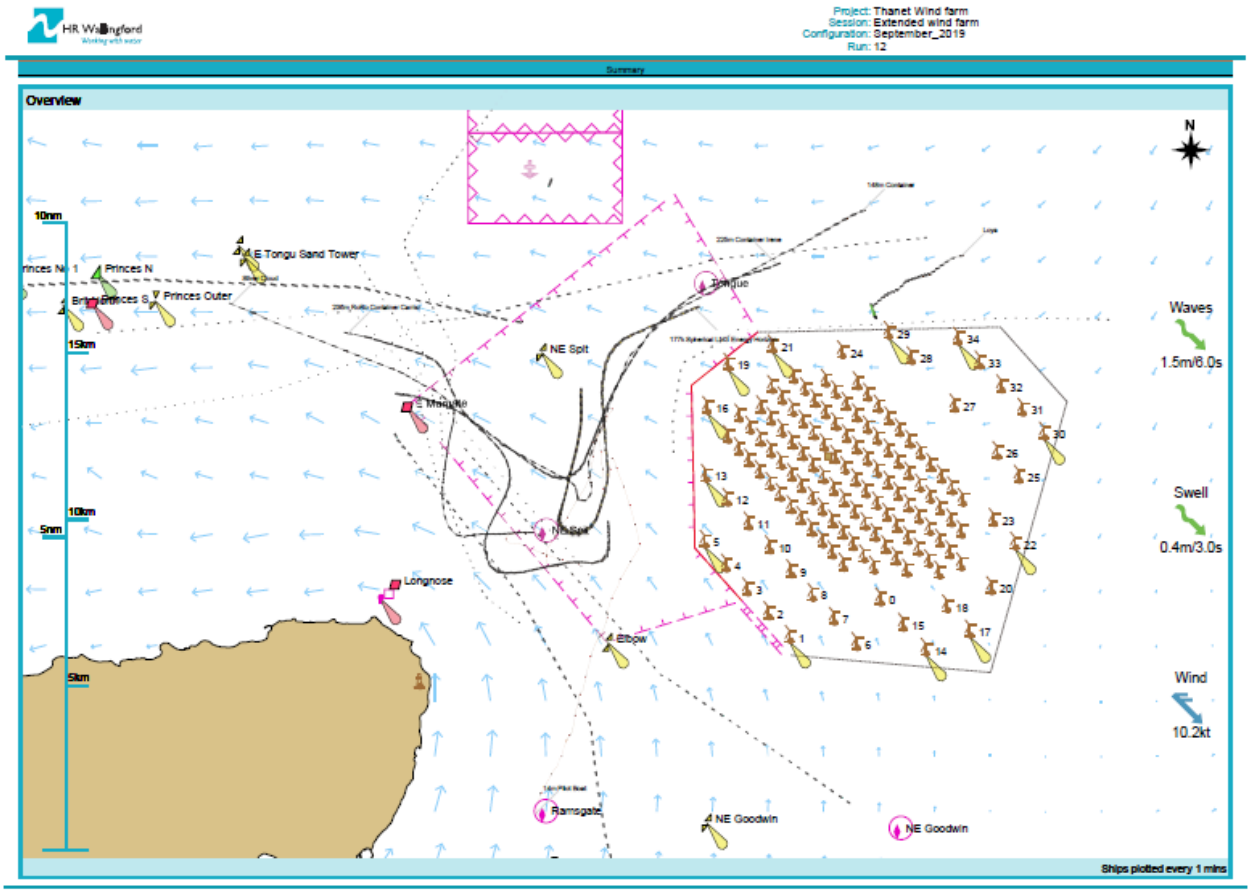

Figure 2 Pilot transfer plot (Run 12) taken from Applicant's 2019 PTBS submission

30 In summary therefore, the number of simulated runs were confirmed by HR Wallingford as being suitable to meet the objectives of the study, with parameters generally representing the upper 5% 'limit states' of experienced regional conditions. This resulted in simulated scenarios that are representative of a degree of complexity rarely encountered either currently or forecast to occur in the foreseeable future. The success rate achieved from 159 simulated pilot transfers at limit states was 98%, with all runs being undertaken safely. Therefore, there can be no justification or rationale for undertaking further runs.

Not reflective of local operations

31 PLA and ESL in particular note that the simulation did not replicate existing operations of the area. MCA and TH also noted that whilst the independence of the study was welcome, on occasion the lack of local knowledge was apparent. PLA/ ESL also stated that the simulation did not appear to present night conditions accurately, emergency runs were unclear, and that metocean conditions were not accurate. The following addresses MCA and TH's response initially, before addressing PLA/ESL's technical observations.

32 The Applicant would note that for reasons provided within this wider response the agreed objective was not to duplicate local knowledge and pilotage operations, but to validate previous studies and understand the feasibility of pilotage and vessel management by experienced mariners less familiar with the region. Notwithstanding this the Applicant would note that the navigation simulation did reflect core distinctive elements of ESL's operations, and elements of ESL's operations that have been identified in the PLA/ESL NE Spit specific NRA. Examples include distinctive operations conducted by ESL, known as 'dipping down' which requires vessel masters heading inbound to the Port of London in an east to west direction across the north of the existing OWF, or west to east from the Port, to 'dip down' into the NE Spit pilotage area (illustrated in Figure 2). This act was discussed during examination and is a reflection of operational preferences for ESL, notably less time for the cutter and staff at sea and requires vessels to effectively enter a the inshore area before then turning back to the required course.

33 A further example is the prioritisation of embarkation of pilots on to inbound vessels. This was identified in the PLA NRA of NE Spit as a control measure not carried forward due to the baseline risks being low. During examination however PLA and ESL indicated that despite this record it was a control applied by ESL coxswains (REP5-070). The Applicant therefore applied this same operational standard during the second PTBS simulation runs, prioritising, where safe to do so, pilots embarking on inbound vessels before disembarkation of pilots from outbound vessels. These are two examples of ESL specific operations undertaken at the NE Spit which were simulated during the 2019 PTBS.

34 It is also of note that a number of runs simulated during the 2019 PTBS were similar to those simulated during the 2017 PTBS. Whilst not intentionally designed to reflect the 2017 PTBS the results provide a useful indication of the similarity in results immaterial of the use of mariners with local knowledge (ESL) or independent expert mariners (from 3 different pilotage districts). For reference the following runs are comparable between the 2017 and 2019 PTBS studies (in terms of wind direction and speed) and were all completed successfully by the respective participants using the same transfer heading, whether this was ESL or the independent mariners.

2017 PTBS Run Number	Wind Direction	Ship Type	Transfer Heading	2019 PTBS Run Number	Wind Direction	Ship Type	Transfer Heading
1	SW 25 kts	Grande	000T	NEA5	SW 20 kts	299m LNG	000T
7	S 25 kts	Grande	300T	NEC6	S 45 kts	120M Heavy Lift	305T
10	NW 25 kts	Grande	030T	10	NW 30 kts	236m Con Ro	030T
11	NE 25 kts	Cruise Ship Majestic Sunrise	330T	05	NE 25 kts	Cruise Ship Silver Cloud	330T

35 With regards feedback from Trinity House on the lack of local familiarity being occasionally apparent, the Applicant can confirm that on occasion the simulation participants extended pre-simulation briefings in order to discuss approaches and understand constraints, this reflected a reduced level of local knowledge and the need therefore to ensure that coxswains and pilots were agreed on the preferred approach. Had IPs with greater local knowledge been present the discussion may have been reduced, or increased, in order to discuss the existing practices. The objective however was for participants to apply their own experience, expertise, and judgement in carrying out the pilot transfer, exactly as would be the case for mariners entering the area prior to taking on a pilot or for new PLA/ESL pilots and coxswains. Furthermore, the vessel masters did not undertake passage planning in advance of each simulation run, as would happen in real life. The result of this was that the runs were more challenging for the participants than would ordinarily be the case, adding further precaution to the result of the simulation.

36 A key consideration raised during examination was regarding the need to assess the implications for mariners that were not familiar with the area; this was noted by Captain Roger Barker (Trinity House) during Issue Specific Hearings and in Trinity House representations. The representations were made in reference to the 2017 PTBS, which relied entirely on PLA/ESL pilots and coxswains, using the PLA pilot training facility, which concluded that the proposed project did not introduce any impediment to operation.

37 The Applicant has therefore undertaken a full pilot transfer bridge simulation with extensive local knowledge, using the pilot transfer simulation employed by PLA for the purposes of training pilots and coxswains in the area (2017 PTBS). To complement this, the Applicant has now undertaken a full pilot transfer bridge simulation using a navigation simulation facility recognised as one of the leading facilities in Europe (2019 PTBS), a fact recognised by the London Pilots Council at Deadline 3:

38 "*All Pilots have experienced the superior facilities offered by either Wallingford or Marin in the Netherlands which can offer the required superior multi vessel navigation situations, weather effect, reduced visibility and manoeuvring conditions of different vessel types required for a credible NRA*",

39 Further endorsement was also provided by the PLA in their Deadline 7 submission:

40 "*Rather than relying on the PLA simulator, it would be more appropriate and provide a more realistic simulation to use a full mission simulator with the capability to operate more than one vessel at a time, such as the HR Wallingford sim*"

41 Endorsement of the HR Wallingford simulation facility was also received from a technical adviser on behalf the Ports of Tilbury and London Gateway at Issue Specific Hearing 2, with Vince Crockett (Technical adviser, HR Wallingford) noting that it would provide a better account of larger vessels and metocean conditions.

42 In light of this the Applicant considers that the navigation simulations submitted in support of the application represent a robust evidence base, the conclusions of which should have significant weight placed on them. The evidence base represents full simulation undertaken by both IPs and independent expert mariners, the former offering IPs the ability to fully represent local operations, whilst the latter provides confidence that mariners with less local knowledge are able to carry out operations without meaningful impediment and without a significant increase in risk. As such the combined simulations provide a full and comprehensive account of both local and non-local knowledge and the presence of local IPs at the second PTBS would not materially alter the conclusion that operations may continue safely and without meaningful impediment.

43 With regards the more technical commentary received from PLA/ ESL it is, again, important to note that the practitioners were not seeking to precisely duplicate local operations, the objective of the 2019 PTBS was to understand the feasibility of operations with independent mariners, with the conclusion reached that there is no impediment to pilotage (the same conclusion reached when local mariners undertook the 2017 PTBS). However, it is also important to note that acts of pilotage and the principal of achieving a lee is universally accepted, and as such the mariner practitioners employed their experience of achieving a lee and completed all operations safely.

44 With regards night-time operations, or reduced visibility it is accepted that at nightfall, conditions change at sea and that seafarers tend to be more cautious. In conditions of darkness and reduced visibility, lights and their characteristics become enhanced in their usefulness to the mariner, but the radar response provides the same image available to the mariner day or night. In reality, night navigation represents no greater risk profile to pilot transfer operations than restricted visibility, metocean conditions do not change because it is dark and pilot ladders are no more likely to fail or be rigged incorrectly in the dark. ESL and PLA have previously confirmed (within the 2017 PTBS) that the critical phase of each pilot transfer occurs in the setting up of the geometry of a transfer. On a pilot cutter, with a visual horizon of 4 miles at best, most of the collision risk assessment and intercept planning is achieved beyond that range and is therefore invariably completed using radar and AIS, out of sight of the vessel and therefore effectively ‘in the dark’ visually.

45 With regards metocean conditions, simulations have some limitation and it is the role of practitioners to make sufficient allowances for limitations of the equipment in drawing conclusions from the simulations. The simulator at HRW is widely acknowledged as one of the best in the world and was the location of choice by the IPs when considering a rebuttal simulation. The limitation of the night capability in simulation was considered, discussed and accepted during the set-up day, but not considered to offer a significant limitation to the validity of the conclusions reached, for the reasons identified above.

46 HR Wallingford are accepted as a competent organisation in ship and hydrodynamic simulations and in order to remain at the leading edge of technology, invest significantly in terms of time, expertise and funding to ensure the data they use is accurate, up to date and realistic. It should be noted that the PLA are partners with HR Wallingford for their own simulation needs and regularly contribute data updates to ensure that hydrodynamic data for the area held by HR Wallingford is correct. This is sufficiently so for this simulator to be selected as the simulator of choice for use by the IPs, had they elected to undertake their own simulation. As has been noted previously the PLA, at Deadline 7, specifically identified the HR Wallingford sim rather than relying on the PLA simulator used for pilot and coxswain training.

47 In terms of validation of the metocean conditions, as stated in the set up documentation and in the final report on the 2019 PTBS, the MCA, Trinity House, and a representative of the Port of Tilbury and London Gateway attended, actively questioned and were proactively given the opportunity to comment on every aspect, including any perceived lack of accuracy of simulation. There was no such feedback. The Applicant also provided transparent records of all independent mariner views, a very small minority of which included comments on the representation of metocean conditions and their effect on vessels. These comments reflect the openness in which the simulation was conducted but do not detract from the overwhelming majority of comments that confirmed the accuracy and reliability of the simulation. Had there been fundamental issues with the accuracy of metocean conditions, these would have been reflected in the comments received.

48 It is also noted that ESL specifically have identified that they consider certain runs to be impossible, due to their assertion that wave height should have been 3m for a specific run, which would have rendered the pilot transfer unachievable. The Applicant notes that ESL are of the view that wave heights should have been 3m Hs (significant wave height) which may have rendered a pilot transfer unachievable, however it is important to note 2m was simulated. It may be that at 3m Hs it would have been dangerous as suggested by ESL, however this is not what was simulated. The Applicant accepts ESL's experience of the wave heights given this wind direction (although noting that wave heights are not only related to prevailing wind speed but factor in the period that the wind has blown from that direction and therefore will vary, possibly up to 3m Hs). This is therefore a question of whether the specific metocean conditions were correct, which were checked with attending mariners and the simulator operator. The simulation has not therefore allowed something 'impossible' because the transfers were undertaken at 2m Hs.

49 In summary the objective of the 2019 PTBS was not to duplicate existing operations, but to independently test feasibility of pilot transfer under a range of existing metocean and traffic conditions, and future traffic scenarios inclusive of increased traffic density and vessel sizes. The objective was met, with all participants concluding that the simulation reflected adequately the expected conditions.

Qualitative analysis

50 The MCA noted that it is important to consider the qualitative elements of assessment in addition to the more quantitative elements such as quantitative risk assessment. Specifically, in the context of simulations such as the PTBS it is important to note that whilst the technology itself may be considered quantitative, the process of undertaking the transfer requires qualitative judgement, as does the subsequent debriefing and discourse. In the hierarchy of assessment in support of Navigation Risk Assessment (table 18 of the MCA's methodology for assessing offshore renewables[1]), bridge simulation is considered second only to sea trials in terms of human involvement.

[1] Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI), 2013 (DfT, MCA)

51 Analysis of the combined quantitative and qualitative data arising from the feedback and debrief also adds qualitative validation and evaluation. In this context it is clear that navigation simulation when undertaken in a collaborative, inclusive and discourse-based manner, as was the case on the 2019 PTBS, represents a blend of qualitative and quantitative analysis that seeks to address IP concerns in a rigorously scientific manner.

52 The MCA also note that the navigation simulation should not be taken as a replacement for the NRA. The Applicant agrees and refers to the navigation simulation objectives presented within the 2019 PTBS report which identify that the navigation simulation outputs should be used to confirm whether any issues arise that may require an update to the Navigation Risk Assessment Addendum (REP5-039) as submitted in examination. The conclusion drawn was that the positive outputs of the independent mariner simulation were such that the NRAA did not require an update; the PTBS added substantial additional weight to the conclusion reached.

Future baseline

53 PoT/LG, MCA and CoS both reflect on the importance of considering a future baseline and the possible increase in vessel size and number. The CoS reflect that day 5 of the simulation was important in addressing this by simulating runs with vessels that do not currently but may in the future use the area. PoT/ LG noted that during Examination the future baseline of 10% may not be sufficiently representative of the PoT/LG aspirational growth. This was also a matter on which the MCA deferred to the PoT/LG.

54 The Applicant notes that local IPs (ESL) informed the examination at Issue Specific Hearing 2 that the Goodwin Deepwater pilot diamond (to the south-east of the proposed project) was anticipated to increase in traffic as a result of the proposed developments at London Gateway and Tilbury2. Large vessels utilise this pilot station instead of the inshore route stations (North East Spit and Elbow). This observation is important context when considering the potential impediment that the proposed project may have on future larger vessels, i.e. large vessels already take on pilots and deviate around the wind farm rather than taking the nearshore route.

55 The Applicant also notes that all references within the response appear to reference submissions made prior to the Deadline 7 submission (REP7-026) made by the Applicant regarding future baselines. Appendix 16 to the Applicant's Deadline 7 submission presented a detailed analysis of the most contemporary Department for Transport (DfT) figures available at that point, and wider DfT forecasts and research reports.

56 The report focussed specifically on patterns of vessel numbers, in terms of port arrivals and presented trends in vessel numbers alongside trends in vessel freight tonnage, the latter having been identified by IPs as increasing over time and having been identified in the MMO's Future Analysis report as likely to increase. Whilst the latter report also identifies the predicted growth in the assumed context of Thanet Extension being consented, the Applicant's Deadline 7 submission critically identifies that growth in freight tonnage cannot be taken to mean a total growth in vessel numbers. This is particularly true for unitised freight traffic which is responsible for driving much of the growth in port traffic in the long term but is also subject to the greatest change in vessel size with the pattern being for larger vessels (short term growth from unitised freight traffic is offset by decreases in other categories of traffic)[2].

57 The Applicant's Deadline 7 submission noted, specifically with regards traffic attributed to the years since the development of London Gateway, that there is evidenced neutral growth/slight decrease in Port of London vessel arrivals in the last few years since the opening of three new London Gateway berths during that time. Therefore, it is very clear that expansion of port facilities is not directly linked to an overall increase in Port of London traffic.

58 The Applicant's Deadline 7 submission therefore concluded that there is no clear relationship between tonnage and ship arrivals at the Port of London. Tonnage was seen to increase over the periods studied (6.9% for the period 2000-17 (see Section 7 of the report), but vessel arrivals remain broadly static with an average growth of -0.05% over the period 2009-17 for which data are available. In light of this the Applicant proposed a 10% increase in vessel numbers as a reasonable and appropriate future baseline for the purposes of assessment. This aligns with projections made for other OWF developments, and specifically accords with predictions made elsewhere for the Thames.

[2] Department for Transport, January 2019. UK Port Freight Traffic 2019 Forecasts

Quality of consultation

59 PoT/LG note that matters raised during consultation for the 2019 PTBS have not been adequately addressed or afforded due consideration. In particular it is stated that the Applicant appears not to have given due consideration to future baselines, suggesting HR Wallingford were not consulted. Future baselines were addressed in the context of the navigation simulation through the traffic scenarios presented in the iterations of the simulation specification. The specification was also submitted to HR Wallingford for planning purposes and the assumptions, i.e. background vessel densities derived from AIS data compressed into the simulation to give increased densities, applied to the simulation.

60 PoT/LG also note that their feedback was not addressed with regards the report being drafted by an independent body. The Applicant can confirm that HR Wallingford and Marico Marine collaborated on the navigation simulation and results drafting, with examples of HR Wallingford drafting being Annex E (Run report Grid/results), and Annex F (Marginal runs and track plots).

61 It is also important to note that the Examining Authority did not make a formal request or Procedural Decision requesting the 2019 PTBS be undertaken, the Applicant undertook the 2019 PTBS as a direct response to IP requests to provide confidence in the conclusions of the previous submissions and conclusions of the NRA. The 2019 PTBS was undertaken following significant consultation with all parties and due regard being given to all received responses.

Conduct of simulations

62 PoT/LG in particular raise a question regarding the conduct of the simulation and the utilisation of Marico Marine rather than a fully independent study undertaken by HR Wallingford. Marico Marine operated as facilitator during the simulations, ensuring that participants received pre-run briefings and that the post-run briefings were structured consistently. It is however important to note that whilst HR Wallingford played an important technical role in operating the simulation three representatives were present that were available to respond to participant queries, an example of which was ensuring that vessels reacted as realistically as possible – this was through direct liaison between HR Wallingford and the participants.

63 Beyond the technical input provided by HR Wallingford with regards the development of appropriate metocean conditions, vessels etc. as described in Section 4.1 of the 2019 PTBS study '*The Role of HR Wallingford in the Simulation*', it is also important to note that the process of setting up the simulation exercises was a collaboration between HR Wallingford and Marico Marine, through reference to IP feedback, submissions made during Examination, and critically the navigation simulation specification which was submitted to IPs and updated following receipt of further feedback. Given the navigation simulation specification was also submitted during Examination the specification was informed by HR Wallingford as technical witness on behalf of the PoT/LG during examination, independently through collaboration with Marico Marine post-examination, and during the navigation simulation set-up day facilitated by HR Wallingford; all IPs were afforded the same opportunity to inform the 2019 PTBS both during examination, post-examination and during the navigation simulation setup day.

64 In this context, whilst Marico Marine acted as facilitator on the day, HR Wallingford have provided valuable input and directly influenced the simulator process collaborating with the Applicant and representing the IPs.

Conclusion

65 The foreseeable and reasonable limit states for relevant parameters identified by the Applicant and IPs have all been simulated, with a 98% success rate, and all transfers undertaken safely. The Applicant concludes therefore that the simulation provided an adequate number of scenarios to meet the agreed objectives of the study. Given the success rate of simulations at the upper limit states and accepting that the remaining standard operating states will be no less successful, the Secretary of State can therefore be confident that sufficient runs have been simulated, and accordingly place significant weight on the outcomes of the 2019 PTBS.

Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex B - Point by Point response on Shipping and General Matters

Submitted by Vattenfall Wind Power Ltd

Date: 31 January 2020

Revision A

Drafted By:	VWPL
Approved By:	Daniel Bates
Date of Approval:	January 2020
Revision:	A

Revision A	Original Document submitted to the Examining Authority
N/A	
N/A	
N/A	

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Table 1 Shipping responses

Consultee	Ref	Comment	Applicant response
PLA	PLA-001	The PLA and ESL previously commented on Appendix 42 to the Applicant's Deadline 6 Submission: Thanet Offshore Wind Farm Collision Assessment of Proposed Extension (the "Collision Assessment") in their Deadline 7 submission (PLA 30 / ESL 30). These further comments should be taken in addition to those submitted in June.	Noted, the Applicant has responded to specific points within this document.
	PLA-002	The PLA and ESL's concerns about the effects of the Proposed Extension remain largely unaddressed by the Applicant. The extension would encroach into the existing shipping lanes, lengthening journey times into the Port for commercial services that would have to re-route around the extended wind farm. The National Policy Statement for Ports (January 2012) recognises that shipping will continue to provide the only effective way to move the vast majority of freight in and out of the UK, and the provision of sufficient sea port capacity remains an essential element in ensuring sustainable growth in the UK economy. In particular, the Ports NPS:	The Applicant sets out its final position on planning policy, including the Ports NPS in REP8-009. In summary whilst the Ports NPS is a relevant consideration for the Secretary of State, as agreed with MCA and TH in their relevant Statements of Common Ground, there is sufficient sea room for safe passage of transiting vessels west of the wind farm and therefore there is no reason for vessels to re-route.
	PLA-003	a) Defines a need for unimpeded access to ports with water deep enough for the largest ships in order to meet the forecast demand for additional port capacity (as defined in Paragraph 1.1.2);	
	PLA-004	b) Confirms that ports play a vital role in support of the national and regional economy, trade and growth;	
	PLA-005	c) Identifies that "currently, the largest container and ro-ro terminals are in the South East" and that "much of the tonnage handled is concentrated in a small number of ports, with the top 15 ports accounting for almost 80% of the UK's total trade"; and	
	PLA-006	d) Identifies a need for ports to be efficient and competitive to enable them to contribute to long term economic growth and prosperity.	
	PLA-007	Two of the top ten largest ports in the UK are located on the banks of the Thames Estuary and the most recent available figures (from 2018) show that the ports of London and Medway handled over 63 million tonnes or 13.4% of the total UK throughput of goods (in tonnes – www.Gov.uk, Port Freight Statistics). The need to support increased energy production from sustainable low carbon sources should therefore be balanced against the need to support shipping and port activities.	The Applicant has proposed a Structures Exclusion Zone which, as demonstrated by the Applicant's evidence including the 2019 PTBS, ensures there is sufficient sea room for shipping and port activities, both now and in the future, to safely co-exist with the project.
	PLA-008	The existing windfarm already presents challenges to ESL and PLA Pilots, especially during busy times and particularly during periods of strong winds, causing delays to vessel arrivals within the Port of London; these challenges would be exacerbated by the proposed extension. The PLA and ESL consider that any extension to the south and west of the existing wind farm will increase significantly the risks to navigation for all types of vessels, especially those using the North East Spit Boarding and Landing Area to enter or depart the Thames Estuary. The proposals would push the Pilot boarding station further from the shore, adding additional cost to the service by lengthening the pilotage act, necessitating additional vessels, fuel and crew. This would also make the Port of London less resilient in bad weather, as pilots would be less able to board in heavy seas.	Delays caused to vessel arrivals due to the existing wind farm have not been evidenced by PLA or ESL and it is not clear in what set of circumstances this would arise. Whilst it is accepted that some pilot transfers will necessarily be altered due to the wind farm (i.e. where the transfer had occurred in areas occupied by turbines), the results of the 2019 PTBS do not indicate that delays are likely or necessary.
	PLA-009	It is acknowledged that the Applicant submitted a material change to the proposed extension to include an SEZ (or Structure Exclusion Zone) during the examination process of the DCO. However, this has not adequately addressed the PLA's concerns regarding the reduction in sea room to the west and south of the wind farm, which will affect the shipping corridor running north west/south east between it and the shore. Even with the modifications, the proposal would push vessels further west towards shallower waters and	It is noted that PLA and ESL are principally concerned with the potential for commercial effects on their operation although the Applicant has demonstrated, most recently through the 2019 PTBS, that there is no evidence why pilot transfers cannot continue in largely the same way as at present.

Consultee	Ref	Comment	Applicant response
		reduce the width of the sea room. Because of the impact on pilotage, this will lead to an increase in the number of shipping delays for both London and Medway.	
	PLA-010	The PLA has expressed concerns regarding the Navigational Risk Assessment throughout the examination, including data used and the viability of specific studies, identification of relevant hazards and impacts and the validity of the NRA methodology. This is also the case with regard to the data collected as part of the Hazard Workshops, which took place mid-way through the examination process.	The Applicant submitted an MGN543 compliant NRA and since the start of the examination has responded to PLA concerns with additional analysis, data and modelling, as set out in Annex C. This additional evidence demonstrates that the conclusions of the NRA and NRAA are robust, reliable and precautionary.
	PLA-011	Notwithstanding the decision made by the Examining Panel not to request the Applicant undertake further pilot simulation studies, as "it will be for the SoS to determine whether to accept any such work in due course", the PLA and ESL are aware that Vattenfall have sought to engage Interested Parties in undertaking a further Simulation Study. As explained below, due to lack of pilot availability, the PLA and ESL were not able to be involved in the further simulation. Furthermore, the PLA and ESL have invested significant time and resources into the Thanet Windfarm extension process with very limited concessions or adjustments made by the Applicant. The results of the further simulation do not, from the PLA or ESL's point of view, alter the acceptability of the proposed extension to the wind farm, and as with the previous Study, the PLA considers that an extension to the west and south would cause significant adverse impact.	In response to the representations of IPs the Applicant made a material amendment to the project, significantly reducing the westward extension of the wind farm, as well as offering additional risk controls. This was in addition to the amendment made prior to the Application as a result of section 42 consultation responses. PLA and ESL have not sought to engage on detailed discussions regarding the boundary despite being given every opportunity to engage in open discussion, for example at the technical workshop arranged prior to Deadline 3. This suggests that theirs is a fundamental objection to the project, one which the Applicant could not address despite significant changes to the project being made and efforts to find common ground.
	PLA-012	With the above in mind, and in consideration of the PLA's and ESL's formal submissions made throughout the examining process, the PLA and ESL respectively request that the proposal to extend the existing off shore windfarm at Thanet is refused.	
	PLA-013a	**MAIB Definitions and Data Set.** In their introductory comments on the Collision Assessment at Deadline 7 (PLA 30 / ESL 30, page 19), the PLA and ESL raised concerns over the reduction in the number of years of MAIB data compared to the original Collision Risk Model ("CRM"). The Applicant did not address these concerns in its Deadline 8 Response (Appendix 5 to Deadline 8 Submission: Applicant's Response to Interested Parties Deadline 7 Submissions – Shipping and Navigation) and so these concerns remain. The CollRisk modelling calibrates its vessel to vessel collision function using historical incidents that led to "material damage" as defined by the MAIB (section 4.2/page 10). The definition included at footnote 4 of the Collision Assessment appears to be drawn from Annex B to the MAIB 2018 Annual Report. However, the term "material damage" as used by MAIB appears to be only one element of the MAIB's defining criteria of a marine casualty and not the definition of a collision itself. The MAIB definition of "damage to marine infrastructure external of a vessel that could seriously endanger the safety of the vessel, another vessel or any individual" (as quoted by Anatec in the footnote) therefore refers to one element, and does not define a collision itself. Using that definition for the CollRisk modelling means that a collision that doesn't result in 'material damage' would not have been included when benchmarking historical collisions. The Collision Assessment therefore provides only a partial assessment of collision risk.	Anatec's COLLRISK model is calibrated on 20 years of data (1995-2014). However as standard within Anatec navigation assessments they only show the most recent 10 years of data figuratively and explanatory, this includes all incidents not just those used to calibrate the model. Full details of the MAIBs definition of Material Damage can be found in MGN 564, focusing specifically on vessel to vessel material damage means 'the structural integrity, performance or operational characteristics of the ship or infrastructure are significantly affected, and requires major repair or replacement of a major component or components'. Minor scuffs / contact with no damage is specifically excluded to ensure the model is reliably calibrated and that outputs can be benchmarked against other studies. Minor incidents are more likely to go unreported therefore, to include only reported minor incidents would distort the results. Using incidents where at least one vessel suffered material damage provides a reliable dataset and therefore a reliable assessment of collision risk (albeit excluding minor incidents).
	PLA-013b	In section 6.1 of the Collision Assessment only one of the four collisions that have occurred within the NRA study area specifically references "material damage" as a result of a collision. It would appear that potentially two, possibly three, previous collisions are not used for CollRisk calibration purposes. It would appear that there are collisions within the MAIB's historical data set that do not result in 'material damage'. They could therefore have	Only collisions where at least one vessel suffered material damage were used in the calibration and therefore the results of the assessment do not include minor collisions. However, all incidents within the area of interest were included within the report for completeness.

Consultee	Ref	Comment	Applicant response
		been removed from the vessel to vessel collision modelling calibration process, but it is not clear whether or not they have been removed.	
	PLA-013c	The PLA and ESL also note the conclusion in section 6.3 that “the timeframe within which data has been assessed is insufficient to draw firm conclusions”. The PLA and ESL assume that this is referring to the MAIB data set 2005 to 2014 and would agree that firm conclusions cannot be drawn from this. As previously expressed, a more appropriate assessment would have encompassed a larger study area (as requested at the Hazard Workshop) and a longer data set; 20 years, for example, would have included data from before the windfarm was built in 2009.	The assumption is incorrect. In section 6.3 where it is stated that “the timeframe within which data has been assessed is insufficient to draw firm conclusions” relates to the operational period of Thanet Offshore Wind Farm (TOWF) and that this period has yet not been long enough to make firm conclusions. The full sentence reads 'However, it should be considered that the available data provides no indication that the TOWF has had any notable impact on collision frequency since it became operational (albeit noting that the timeframe within which data has been assessed is insufficient to draw firm conclusions)'.
	PLA-013d	The NRA study area is an area of complex traffic behaviour with a highly diverse vessel mix and the PLA and ESL are concerned that this complexity and the subsequent management of this has not been fully addressed in the Collision Assessment. The Anatec Assessment does not give the PLA and ESL confidence that the assessment has fully considered the impact of the Thanet Windfarm Extension on the surrounding traffic.	The CRM assessment was focused on specific issues to be considered as part of the application as a whole. The CRM provides additional weight to the conclusions that were drawn in the NRAA by confirming that the increase in collision risk associated with the project (following introduction of the SEZ), is minimal. This corroborates the hazard scoring, the results of which do not anticipate significant (or unacceptable) increases in risk following the construction of the project.
	PLA-014	**Commercial (Regular Routed) Deviations.** As raised at Deadline 7, the PLA and ESL disagreed with the Applicant’s suggestion that recreational traffic is unlikely to deviate from its pre-extension routes. It is reasonable to expect that the extension of the Wind Farm will, as explained during the Examination, have an impact on vessel routes. In addition to their previous submissions, the PLA and ESL would suggest that the recreational traffic tracks from the NRA on-site survey demonstrate the vast majority of recreational craft already deviate around the existing windfarm (NRA/Section 5.3.4/page 48/49) and, therefore, with the extension in place they are likely to deviate further.	The report states in section 3.1 'that given the size and routeing of fishing and recreational vessels it is not considered likely that these vessels will change their habits and deviate or displace from the Option A site in notable numbers’. Based on experience at other wind farm developments and when considering that TEOWF is an Extension site it is unlikely that many small craft will chose to deviate from the routes they are already taking with TOWF in situ. It is important to highlight that this report considers TOWF as the base case and therefore assess the change between TOWF in situ and the development of TEOWF.
	PLA-015a	**CollRisk Overview** When assessing vessel encounters the Collision Assessment has assigned domains (250m squares) to the charted study area. The PLA and ESL’s understanding is that the length of time a vessel inhabits any part of a domain is recorded, generating a total number of minutes/hours occupancy per square across the study period (30 days). The CollRisk modelling then accounts for the type of vessel, its speed, the nature of the encounter and the metocean conditions finally producing a collision likelihood result.	This is correct. The squares in the Anatec model are termed as potential encounter cells.
	PLA-015b	It is unclear if under-keel clearance was considered when accounting for vessel size. When a vessel is required to deviate from its preferred course, the under-keel clearance is a significant factor in determining collision risk, which the PLA and ESL would have expected to be clearly accounted for in the collision likelihood result. Similarly, it is unclear if deadweight is accounted for i.e. whether a vessel is under full cargo load. A vessel’s deadweight can have a significant effect on its manoeuvrability and therefore on its ability to react to a collision situation. Again, this is something the PLA and ESL would have expected to be clearly accounted for in the collision likelihood result. Finally, the Collision Assessment does not make it clear how the type of vessel encounter (head on, crossing, overtaking) impacts on collision modelling results, so the effects of the wind farm extension on collision risk remain unacceptably uncertain.	The model takes into account vessel size (both deadweight tonnage (DWT) and draught) when considering alternative passages and re-routeing, with reference to the available water depth in the surrounding area. The angle of encounter is an influencing factor in estimating the likelihood that an encounter leads to a collision, which aligns with historical research / analysis (e.g., Lewison). In general, collisions are predicted to be more likely in head-on encounters, especially in bad visibility.

Consultee	Ref	Comment	Applicant response
	PLA-015c	There are transit deviation assumptions made for vessels with the SEZ in place, excluding fishing, wind farm support and recreational craft. It is unclear how deviation assumptions are being made for vessels engaged in the act of pilot transfer. This is significant because ships engaged in pilot transfer will often make large course alterations to create a safe lee. Vessels engaged in personnel transfer are given the status of RIAM (restricted in their ability to manoeuvre) under rule 3 of the Collision Regulations. A vessel not engaged in pilot transfer will generally be expected to deviate, if possible, in order to allow the transfer vessel to maintain its course. However, in the experience of ESL and the PLA, the decision on how and where to transfer a pilot can be heavily impacted by transiting traffic. The PLA and ESL strongly believe that deviating vessels transits, as described in section 4.1 (shown in figure 4.1 and figure 4.2), would have had an impact on the conduct and position on a significant number of the 619 transfers that took place within the September data set, and these impacts have not been reflected in the Collison Assessment. The PLA and ESL are concerned that vessel behaviour in the area has been 'averaged out' through deviated course assumptions and vessel speeds being assessed as a whole track average (see the response to paragraph 4.3 below), producing a lower risk result than would be experienced in real-life scenarios.	Within the report section 4.1.2.1 confirms how commercial (merchant) regular routed vessels have been deviated. Simulated AIS data contained within the report does consider navigational features such as channels/water depths, and it is noted that the vessels that were simulated were deviated into already established routes. However it was clear when the methodology for this report was defined that pilot vessels would need to be considered using a tailored methodology to suit their behaviour, this is detailed in section 4.1.2.2 which confirms that "given the nature of pilot vessel operations, and noting that the number of instances of pilot vessels intersecting the Option A site was limited, the associated deviations were implemented on a track by track basis, rather than via the use of grouping tracks into routes." The pilot vessel tracks intersecting a 1nm buffer of the Option A site were individually deviated to keep its transit outside of the Option A site. These deviations are included in Figure 4.3. It is understood that this will misalign some pilot vessels with the commercial vessel they were attending however it is considered a worst-case approach by estimating collision risk associated with displacement and increases in vessel activity (which may not occur). The pilot vessel deviations were simulated to be as realistic as possible and were not averaged out; and by not altering vessels behaviour to give due regard to COLREGS and ongoing pilotage operations this can be seen as a conservative approach.
	PLA-015d	It is noted that the Thanet North cardinal buoy has not been repositioned, even though it could not be left in its current position with the wind farm extension in place. Vessels would transit further to the north of the windfarm than those shown in figure 4.2 in section 4.1.2.1.	In line with standard practice for worst case vessel deviations, it has been assumed that mean route positions will deviate to a position 1nm from the wind farm boundary, which is considered a precautionary approach given a 0.5nm buffer has been recognized during the TEOWF examination as an appropriate distance for the prudent Mariner
	PLA-015e	The overview concludes that "[a]ny assessment of consequence is outside of the scope of this work". The PLA and ESL are unsure how this can be the case when the vessel to vessel collision modelling process uses material damage, a consequence, to inform an opinion on likelihood.	This sentence refers to the more detailed consequences assessment that is included within Anatec NRA i.e. oil spilled, number of fatalities. This level of detail was outside the scope of works and not related to the frequency of occurrence this report aimed to address.
	PLA-016a	**Durations** In section 4.3 simulated tracks have been assigned an average passage speed which would suggest that traffic engaged in pilotage, particularly in the vicinity of the pilot boarding area, could be transiting at a greater speed than in reality, thus inhabiting each 250m domain for less time. This could have the effect of reducing a vessel's occupancy of a square and as such reducing its exposure to collision risk.	Only the tracks deviated have had speeds modified and these were based on their recorded speed, although vessels will slow significantly to board the pilot this would only be for a small proportion of the track and a small period of time. As with deviating the vessels no account is taken for other vessels reacting to the behaviour of pilotage operations which could be considered a mitigation. The quantitative modelling undertaken is only one part of the navigational assessment undertaken for TEOWF which should be considered along with qualitative assessments.
	PLA-016b	There is also uncertainty surrounding the implications of averaged speed for the consequence of the collision. The CollRisk software benchmarks risk likelihood based on the consequence of historical incidents, but it is problematic that the CollRisk modelling is calibrated using the material damage definition as described in the initial comments in relation to the MAIB definitions and data set, set out on page 3 above. It is unclear how the study can support the conclusion of ALARP if it hasn't given full consideration to what the consequence of a collision would be.	The Anatec report does not make reference to ALARP and instead aims to quantify frequency. This report is part of the overarching statement of risk made for TEOWF. The results of the assessment are intended to be used as one element to determine acceptability of risk, taking into consideration that the results do not include minor collisions (scrapes or bumps). In terms of supporting the conclusion of ALARP, the results of the CRM, which indicate a very low increase in collision risk, support the highly precautionary increase in likelihood that was included in the NRAA hazard scoring. Input from IPs at the hazard workshop led to an assessment based on a doubling of collision risk. The CRM identifies a 4% collision risk increase.
	PLA-016c	As the PLA and ESL have previously stated it is unclear how long an individual square will need to be inhabited by a certain type of vessel to impact upon the likelihood of a collision.	Every second of vessel being within a cell adds to the level of risk. This is a conservative approach as no returns are excluded based on the period of time being too short.

Consultee	Ref	Comment	Applicant response
	PLA-017	**Collision Assessment** The PLA and ESL are concerned that although both Anatec and the Applicant have recognised that the latest Collision Assessment is not comparable to previous work within the Thanet Extension NRA and other windfarm NRAs, they then appear to make quite detailed comparisons with other Wind Farm Projects such as those in Table 5.2. The Assessment does note that the results of Table 5.2 are not directly comparable (in the sense that the risk estimated for the TEOWF would increase in an equivalent study area). It then goes on to make such a comparison concluding – despite saying that the comparison is only 'illustrative' – that the lower risk is reflective of the associated deviations being minor in comparison to the other projects, noting that re- routeing has already been established around the TEOWF. It should be noted that the four other windfarms referenced in section 5.4 (table 5.2) are 'new' windfarms and therefore deviations would be larger for those windfarms as no previous obstruction existed. To our knowledge none of the developments in table 5.2 have a busy pilot boarding position in close proximity to their boundaries, unlike the proposed TEOWF extension.	TOWF is considered to be the base case and the purpose of both the navigational risk assessment and Anatec's report is to qualify (or in the case of the Anatec report quantify) the risk. Displacement (or the change in risk) therefore should only be considered from the current traffic patterns and densities and not from what traffic was doing prior to 2009. Anatec does not agree with the statement that "detailed comparisons" have been made, given the report notes that the results of Table 5.2 are not directly comparable 'in the sense that the risk estimated for the TEOWF would increase in an equivalent study area'. With regards to examples used within table 5.2 they are demonstrating sources whereby results are publicly and freely available. As with these NRAs and others each assessment is site specific and takes into account information such as Pilot Boarding, Routeing measures and anchorages as required.
	PLA-018	**Availability to Attend:** ESL operates a 24 hour, 365 day a year service. Each day is divided into two, 12 hour shifts and each shift requires one full launch crew (two coxswains and one seaman). To fulfil a 24 hour roster ESL requires 8 coxswains to be 'on roster' which allows the remaining 2 staff to take leave. Each member of staff is assigned leave 12 months in advance and leave periods are divided into a summer (longer leave periods) and winter (shorter leave periods) roster. Attendance by ESL at the navigational simulation would have required two additional coxswains to be 'off-roster' for a period of 8 days, which would have had an unacceptable impact on ESL's operational service levels. Furthermore, the transition between the winter and summer rosters occurs in late September; the invitation issued in August to the September navigation simulation did not give ESL or its crew sufficient time to arrange for the 'off- roster' crew to attend the navigation simulation. ESL contacted the Applicant by both email and telephone to explain the difficulty caused by this short notice and to request accommodation by the Applicant of their coxswains' availability so that they could attend the simulation. As for the PLA, it has relied on the detailed knowledge of ESL's coxswains throughout the Examination and was therefore supportive of ESL's requests to accommodate their coxswains' availability for the simulation. Both the PLA and ESL are confident that with more notice a suitable date could have been found that would have enabled the coxswains to attend while also leaving sufficient time for the Applicant to prepare the revised Simulation Report to assist the Secretary of State in his decision about making the Order.	As set out in the PTBS report, ESL did not contact the applicant other than by a short email on 2nd August. The Applicant called ESL on two occasions following their withdrawal from the simulation to seek a solution to their attendance. The Applicant did not state or require two members of ESL to attend for every day of simulation, this was a self-imposed restriction that ESL set. The Applicant confirmed to ESL that even attendance for 1 day could be beneficial (as was the case with other IPs who attended a small number of days) and there is no doubt that many of the issues raised in ESLs response relating to metocean conditions, lees, ladder assignment etc could have been discussed with the independent mariners during one day of attendance. The Applicant is not aware of any similar reason for PLA's non-attendance and considers that the attendance of the PLA and PLA pilot (given their local knowledge) could have also contributed to these discussions. The criticisms of the simulation are principally related to the PLA/ESL's non-attendance, despite the Applicant doing everything it could to facilitate their attendance and participation, inclusive of changing dates to align with PLA's suggestions.

Consultee	Ref	Comment	Applicant response
	PLA-019	**Number of Runs:** The number of runs, 15 – 40, may be suitable to draw meaningful conclusions on the feasibility of boarding and landing specific vessels in certain specific conditions with the available sea-room. However, it is not representative of the range of conditions and the relevant sea room. The PLA and ESL wrote to the Applicant on 31 July 2019 stating that they would expect at least 100 runs to provide a representative assessment of an acceptable range of weather and tidal conditions, vessels, day/night passing traffic, human factors and scenarios. As a result, the number of runs carried out is not sufficient to draw meaningful conclusions on the acceptability of the risk and therefore not sufficient to conclude that this simulation supports the conclusions of the NRA and NRAA that the risks have been reduced to ALARP.	The number of runs (41) of the 2019 PTBS was confirmed by the operator (HR Wallingford) as being appropriate, in their experience, to meet the objectives of the study. The figure of 100 runs (previously 120 runs as referred to in the IPs comments on the PTBS specification) is entirely arbitrary and there has been no attempt to justify it. The PTBS run schedule was put together to test a wide range of metocean conditions providing a representative spread of 'limit state' scenarios. It is not a requirement of any navigation simulation to test all conceivable scenarios and crucially the IPs have not identified which set of parameters the PTBS did not consider that would have had a material effect on the conclusions. It is clear that after safe completion of all 159 individual pilot transfers in a wide variety of challenging 'limit state' conditions (including all wind directions and wind speeds up to the maximum operating levels for ESL) any increase in runs would be highly unlikely to alter the conclusions in any meaningful way.
	PLA-020	**Tongue Boarding Area:** The Tongue boarding position has not been adequately assessed. In total only three unique runs and one re-run were conducted at this position. The Applicant's report considers the Tongue simulations to be entirely unremarkable and Section 6.3 (Summary of Simulation Results) states that 11 transfers took place with no marginal runs. However in Annex F – Marginal Runs and HRW Track Plots, it clearly states that run 14, a Tongue boarding run, had a marginal result. When reviewing the track plots for runs 13/14/14R/15 it would appear only 8 vessels are served around the Tongue boarding area. If the wind farm is extended under the proposed DCO, the Tongue boarding position will be approximately 0.7nm from the windfarm which is not a safe distance to engage with a vessel for pilot transfer. The Tongue boarding/landing area would be required if the service was displaced from the NE Spit, but this would have significant implications for the pilot service efficiency and resilience to poor weather conditions. This scenario has not been sufficiently tested with only three runs being carried out. The report implies a solution is to simply work further out to sea. This is not a workable solution, as it would increase the distances travelled by the ESL pilot services, thereby reducing cost and time efficiency and resilience to levels which adversely affect the future viability of the pilotage services.	The navigation simulation demonstrated that transfers at the Tongue remained feasible with all pilot transfers being completed safely. Notwithstanding this the Applicant would note that the draft DCO provides for a mechanism to address any residual issues that may arise in relation to displacement of the Tongue.
	PLA-021	**Elbow:** The Elbow is a significant working area for ESL in difficult metocean conditions. The proposed wind farm extension will reduce the operational sea room at the Elbow. There was a marginal run when assessing the Elbow (run 16) which is not referenced in section 6.3 – Summary of Simulation Results. As the use of the Elbow forms a key part of ESL's service resilience, ESL do not consider three simulated runs, all in daylight conditions, to be a robust analysis of the possible impacts on the pilotage service in this area.	The "Elbow" is not a defined or formally recognised pilot boarding station, but it has always been acknowledged by the Applicant that the lee offered closer inshore towards the North Foreland near the Elbow Buoy can produce beneficial conditions for pilot transfer, especially when there is a westerly component to the wind. In recognition of this, during both sets of pilot transfer simulations, runs were specifically designated to examine pilot transfers in the vicinity of the Elbow Buoy. Notwithstanding that during the second PTBS, there were three "Elbow" runs (runs 16,17 & 18) which involved 15 safely and successfully completed pilot transfers, there were no fewer than 29 other successful transfers in other, "non Elbow" runs that took place within 1.5nm of the Elbow buoy. Inevitably as the runs became more complex and they involved more vessels, the geographical spread of transfer locations expanded to meet operational requirements - exactly as happens in reality, and as reflected in the AIS traffic flow analysis for 2017-2019. If these runs are added to those 15 that were conducted during the dedicated "Elbow" runs, there is a total of 44 pilot transfers, conducted within 1.5 miles of the Elbow buoy. This number was by design and is significant in the context that transfers in the vicinity of Elbow buoy accounted for approximately 3% of ESLs transfers between 2017-2018. The marginal aspect of run 16, came about because the Master of a single vessel deliberately chose to manoeuvre under control, to gain a better lee for transfer. At the time, the vessel was safely on a course parallel to the wind farm, and other than the breaching of the artificially added 1nm clearance by a distance of less than 180 metres, the marginality of the run arose as a choice of the navigator. Nevertheless, as stipulated in the set-up agreement, the run was repeated, successfully, to ensure that the principles of fairness and scientific rigour were

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			adhered to. Inclusive of the 're-run' there were 45 pilot transfers in total at Elbow Buoy, encompassing the full range or representative metocean conditions. Of the 45 pilot transfers, a single run was marginal with all transfers being completed safely. Given the lack of any failed runs, 98% of runs recording a pass on all criteria is considered to be sufficiently conclusive such that further repeat runs were not considered necessary. This was also confirmed by the simulation operator HR Wallingford who confirmed the simulation to be sufficient to meet the objectives of the study.
	PLA-022	**Night Runs and Reduced Visibility:** The PLA and ESL has been unable on the basis of the information provided to assess the accuracy of the simulator when replicating night/poor visibility conditions. Simulators can struggle to replicate night conditions and will display 'dusk' instead, which means there is more light and better visibility than there would be in reality. The PLA and ESL were unable to attend the set- up day as it was arranged for a day on which the Applicant was aware that neither the PLA nor ESL pilots could be available. The PLA and ESL were therefore unable to deal with concerns regarding the simulation of night/poor visibility conditions on the set- up day. Nor did the Applicant provide any pictures of these conditions in the Collision Assessment, meaning that the reader cannot determine whether these conditions were appropriately assessed. It is clear, however, that night conditions are underrepresented in the study in terms of the proportion of day/night. In reality, fifty percent of pilot transfers happen at night. Only 10 runs out of 41 were carried out in the simulator under dusk conditions, and in ESL's extensive experience, it is not accurate to say that reduced visibility does not affect the ability of mariners to safely undertake runs; in practice, ESL coxswains have found that night runs have a significantly higher risk factor than day runs due to the increased reliance on technology for example radar and vessel light characteristics. In response to the PLA and ESL's comments regarding representation of different metocean conditions the Applicant suggests the dominance of using south west winds in simulations is an important reflection of the prevailing winds in reality. In reality, 50 percent of pilot runs happen at night so, following the same logic, 50 percent of the simulations should have been undertaken under night time conditions. To have undertaken less than a quarter of simulated runs under night time conditions is therefore misleading.	ESL have not previously raised the issue of significantly higher risks at night. The basis for ESL's opinion is uncertain and this statement is not reflected in the input into any of the risk assessments, is not evidenced by any incident record analysis and is not known as an issue reported in everyday navigation of vessels. It is accepted that at nightfall, conditions change at sea and that by our very nature, seafarers tend to be more cautious at night. In conditions of darkness, lights and their characteristics become enhanced in their usefulness to the mariner, but the radar response provides the same image available to the mariner day or night. In reality, night navigation represents no greater risk profile to pilot transfer operations than restricted visibility, metocean conditions do not change because it is dark and pilot ladders are no more likely to fail or be rigged incorrectly in the dark. ESL and PLA will hopefully acknowledge that the critical phase of each pilot transfer occurs in the setting up of the geometry of a transfer. On a pilot cutter, with a visual horizon of 4 miles at best, most of the collision risk assessment and intercept planning is achieved beyond that range and is therefore invariably completed using radar and AIS, out of sight of the vessel and therefore effectively 'in the dark' visually. All simulations have some limitation and it is the job of practitioners to make sufficient allowances for limitations of the equipment in drawing conclusions from the simulations. The simulator at HRW is widely acknowledged as one of the best in the world and was the location of choice by the IPs when considering a rebuttal simulation. The limitation of the night capability in simulation was considered, discussed and accepted during the set-up day, but not considered to offer a significant limitation to the validity of the conclusions reached, for the reasons identified above.
	PLA-023	**Emergency runs** The run plots in Annex F (Marginal Runs and HRW Track Plots) do not clearly indicate the implications of emergency runs. They are only a brief snap shot of work conducted with no chronological context.	The scope of the emergency scenarios was stated in the simulation specification and IP comments were accepted and incorporated into an updated specification, which was circulated to IPs for consultation during Examination and post-Examination. At the simulation event, during the set-up days, they were further discussed in detail and agreed. After the setup days had completed, they were again discussed and actioned during the main simulation. Each different scenario was described in the set up report, but they can broadly be divided into three main classes: - • Machinery failure in the transfer ship (steering or main propulsion); • Communications failure; and • Pilot ladder rigged incorrectly. Each emergency event was introduced at the discretion of HR Wallingford staff. Incorrect rigging of the pilot ladder and communications failures (either HR Wallingford produced or as a result of "normal" misunderstandings) introduced delays to the conduct of pilot transfers. However, as occurs in real life, they were diagnosed, accommodated and solved by the pilot cutter coxswain/crew. For example, if a pilot ladder was incorrectly rigged, the transfer was delayed and the vessel manoeuvred until the ladder was correctly rigged, at which time the transfer proceeded. Under none of these circumstances did any proximity breach or any other safety-related issue occur. If it had, the independent practitioners otherwise would have noted it and it would be included in the report. Perhaps more significantly, there were a number of steering gear and main engine failures introduced by HR Wallingford staff, occurring during the transfers. As would be expected from such a scenario in real life the Master of the simulated vessel or the pilot, if embarked, quickly assessed the situation and reacted accordingly. Invariably this meant bringing the ship to a stop, then going to anchor. Large ships usually take a considerable distance to come to a

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			stop, but even where the introduced failure occurred with the ship adjacent to the wind farm, there was no breach of the proximity criteria and no possibility of the vessel being set into danger.
	PLA-024a	**Met Ocean Conditions:** The PLA and ESL's in principle agreement concerning the use of the HRW simulator for the purpose of the study did not constitute an acceptance of that simulator and the processing of its results by the Applicant being able to accurately represent the runs being assessed. It would require extensive local experience to agree met ocean conditions were accurately represented and the Applicant has not demonstrated that the required level of local experience was present at the simulation. Not all participants and IPs were present for all met ocean conditions simulated. It is not clear which participant took part in which simulation and therefore what level of experience formed part of the overall assessment. The study gives a broad summary of participant experience which is not sufficient to enable the PLA and ESL to be satisfied as to participant suitability.	The present level of fidelity and realism achieved by modern 360 degree maritime simulators, such as the one at HRA Wallingford, are a globally accepted and accredited method for successful modelling and have been recently used to inform local projects such as port developments at Dover and London Gateway. From that, it is accepted as marine best practice, that today's simulators derive meaningful results which can be applied to and inform the real world. Simulations, such as the second PTBS, have been a universally adopted methodology throughout the maritime world for at least 2 decades by organisations from the IMO, the UN and the DfT and MMO. Moreover, most of the IPs has at some point in the last 5 years employed simulations such as this, to inform investment decisions, assess maritime risk and to routinely train their maritime professionals. HR Wallingford are accepted as a competent organisation in ship and hydrodynamic simulations and in order to remain at the leading edge of technology, invest significantly in terms of time, expertise and funding to ensure the data they use is accurate, up to date and realistic. It should be noted that the PLA are partners with HR Wallingford for their own simulation needs and regularly contribute data updates to ensure that hydrodynamic data for the area held by HR Wallingford is correct. This is sufficiently so for this simulator to be selected as the simulator of choice for use by the IPs, had they elected to undertake their own simulation. It is further noted that PLA, at Deadline 7, specifically requested that "*Rather than relying on the PLA simulator, it would be more appropriate and provide a more realistic simulation to use a full mission simulator with the capability to operate more than one vessel at a time, such as the HR Wallingford sim*". In terms of validation of the metocean conditions, as stated in the set up documentation and in the final report on the second PTBS, the MCA, Trinity House and a representative of the Port of Tilbury and London Gateway attended, actively questioned and were proactively given the opportunity to comment on every aspect, including any perceived lack of accuracy of simulation. The Applicant also provided transparent records of all independent mariner views, a very small minority of which included comments on the representation of metocean conditions and their effect on vessels. These comments reflect the openness in which the simulation was conducted but do not detract from the overwhelming majority of comments that confirmed the accuracy and reliability of the simulation. Had there been fundamental issues with the accuracy of metocean conditions, these would have been reflected in the comments received. In terms of "local experience" being present at the simulation, the absence of ESL and PLA from the entire simulation process obliged the Applicant to use pilots and coxswains who were either as close as "local" as could be achieved in view of the short notice withdrawal of the PLA and ESL (practitioners from Dover or Harwich), or were not local but handled the same vessel types and sizes (Southampton, which regularly handles vessels of a greater size than currently use the inshore area) or had previously worked for PLA or ESL. This allowed the Applicant to make the logical assertion that "if these non-local mariners could operate the North East Spit pilot station safely with the wind farm extension in place, then those that do it on a regular professional basis would be even better placed to achieve this." This is also reflected in Trinity House's comment regarding the additional weight that may be placed on the study due to the use of practitioners without local expertise; recognising that this brought with it additional challenges/delays in geometry alignment which Trinity House also identify. Run NEC4 simulated 45 knot winds from the north west. Given the very short fetch between the Essex and East Anglian coast and the NE spit, wave heights from the north-west are limited, and whilst significant wave heights of 3m may occur, with this wind scenario most waves are lower.
	PLA-024b	The PLA and ESL would usually be able to discuss simulations with other participants, in order to obtain reassurance about methods and participant experience. By contrast, with this simulation, it is understood that the Applicant required participants to enter into Non-Disclosure Agreements and therefore discussion of the simulation with participants has not been possible. The participants have not been named in the simulation report.	
	PLA-024c	Whilst the PLA and ESL acknowledge that south-westerly is the prevailing wind direction at the NE Spit they would like to point out that the North easterly wind is the second most common as suggested in the NRA (Section 3.3 - Metocean conditions). With a proportional approach in mind, north east wind should have been the second most frequently examined direction; however, this was not the case. In the simulator, runs have been carried out to complete transfers in conditions that ESL know from experience would have been extremely dangerous in reality. The PLA and ESL disagreed with 94 of the lees used in the study. In the PLA and ESL's opinion, with an error of 20 degrees or more, trying to maintain physical vessel to vessel contact, particularly in poor met ocean conditions, would be unsafe. For example Run NEC4 – In ESL's experience this transfer would have been physically impossible. ESL would expect a much larger wave height than 2 metres at high water in these conditions (closer to 3 metres). The simulator and coxswain appear to have accomplished something effortlessly that we would argue is at best extremely dangerous and bordering on impossible. In these conditions the extreme amount of movement, for both the ship and the pilot launch, would be so dangerous as to be a manoeuvre that ESL pilots would not be willing to undertake and so in practice it would not happen. The simulation is therefore not reliable as it is based on manoeuvres taking place that would not happen in practice.	

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			The Applicant agrees that with a 3m significant wave height these transfers may have been close to impossible. As it was, a 2m wave height was simulated and the comments recognised the challenging conditions stating 'very heavy weather from the NW, ships were boarded at or close to the Elbow Buoy. Operations conducted safely'. Other comments on these challenging runs in limit state 45 knots winds included as being 'nearer to the limit' and 'very heavy weather pilot launch remained within a couple of miles of elbow which would be the case in weather conditions prevailing'. The one thing the PTBS cannot simulate is the risk to the pilot themselves in boarding in limit state conditions and this is reflected in the comment 'in a real situation this boarding and landing may not have been possible'. However, in this respect, the willingness for a pilot to transfer in limit state conditions is related entirely to sea conditions and their perception of risk and not the presence of the wind farm. The conclusions from the independent mariners were nonetheless, given the extreme conditions, that the simulation was suitably representative and the transfer (in terms of the vessel alignment) was undertaken safely. The comments on these limit state runs including NEC4 clearly indicates that these transfers were not 'accomplished effortlessly' and that what the participants concluded from this simulation run was remarkably similar to ESL's conclusion, demonstrating that the PTBS was testing the 'limit states' and that the participants feedback can be relied upon.
	PLA-025a	**Vessel Lees**: The PLA and ESL are unable to comment on the relevance of participants' experience because it is not listed within the Report and they understand that participants are subject to Non-Disclosure Agreements that prohibit the disclosure of such information. Nevertheless, it should be clear that holding PLA authorisation is not the same as extensive day-to-day experience of this offshore area in particular, and a pilot who is no longer authorised by the PLA does not represent the views of the PLA or current PLA pilots.	The creation of a lee, by placing the hull of a larger vessel upwind and up sea to allow a smaller vessel to come alongside while underway is a universally accepted maritime practice internationally; it is a practice in use for centuries with the term lee or leeward existing since the 1600s and having similar formation in multiple languages. It is accepted that there might be minor differences in met ocean conditions from one pilot station to another, but nevertheless the principle of using a ship to create a lee applies irrespective of geographic location. The very reason that the word 'lee' is part of the international mariner's lexicon is because the method for creating a lee is the same throughout the world. In the 2019 PTBS, 14 different mariners, with considerable global seafaring experience as masters, coxswains and pilots were used during the 7 days of simulation. In addition, the process was witnessed by similarly qualified and experienced mariners from the MCA, and Trinity House, as well as having been overseen by mariners of the simulator provider, HR Wallingford. It is notable that for every transfer, while there was lively discussion and avid attention was paid to every aspect of the process by the participants and observers, there was never an incidence of disagreement on lees between them. It is therefore puzzling that ESL and PLA whilst stating "they do not intend to suggest that the NE Spit is no more difficult to operate than any other area", do not then seem to accept that the creation of a lee for boarding by other suitably qualified marine professionals is valid. Further, if the techniques recorded by the simulation are wrong, or need to be different, there is no explanation of the factors that make the NE Spit almost unique for lee-creation techniques, such that only ESL and PLA are qualified to comment. Lastly, from the Applicant's knowledge of attending the 2017 PTBS, which was conducted by PLA and ESL mariners, it should be noted that there was no difference observed in the techniques used to create a lee, from that in the 2019 PTBS. The obvious exception is that the lees were created by a different set of professional seafarers.
	PLA-025b	However, it is likely that a lack of local knowledge is why there is such a strong disagreement with the lees given to the ships. ESL and the PLA do not intend to suggest that the NE Spit is any more difficult to operate within than other boarding areas. However, each area has a unique set of issues that need full consideration. It is not accurate to make like for like comparisons between boarding areas in the way the Applicant is suggesting.	
	PLA-025c	ESL considers that is inappropriate for the Applicant to disregard the current working practices of the only local operator in this area. ESL has been operating in this area for 30 years, serving an average of 7000 vessels per year. Its working practices are founded on everyday experiences of how to offer a safe and efficient service. The pilotage service currently operates in an area that affords ESL a wide range of safe lees. We strongly disagree with a high percentage of the lees used within the study and believe that with the extension in place there would be greater pressure on the remaining available sea room to accommodate safe lees. In practice, if the wind farm is extended, it will be left to the ESL pilotage service to physically serve vessels further out to sea in combination with a more detailed traffic management approach. This will have significant adverse implications for the current operation and its viability due to increasing run times, reducing service resilience due to operating further out at sea in poor weather and placing strain on the existing launch capacity and traffic management setup.	
	PLA-025d	• There is no detail within the report describing how run orders were decided and what operational considerations were made. In reality these factors are a key part of the service provided by ESL. Given the lack of detail regarding the chronological impacts of each simulator run ESL cannot see how any conclusions regarding service efficiency can be made. On the basis of the information provided by the Applicant, it is ESL's view that the effects of the wind farm on its business would be considerable and would require the pilotage service	ESL would likely operate in a more efficient manner, however this would not lead to improvement in safety of operations over that simulated, it would simply be different. The objective of the simulation was, as has been described elsewhere, to test feasibility of operations with a range of independent mariners with a varying range of familiarity. Given the success of the simulation using expert mariners with limited local knowledge, it can be reasonably assumed that a greater level of local knowledge will lead to a greater level of success.

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		to change the way it operates, including increasing its launch capacity. How ESL conducts its operation will have a significant impact on the navigational safety in the surrounding area. To not represent this in the simulator study, particularly with regard to making a safe lee, limits the relevance and conclusions of this study.	
	PLA-025e	Suggesting that every vessel within the study could have, theoretically, made any lee required of them ignores the fact that the entire structure of each run, as organised by the coxswain, would be influenced by the lees required, as it is in reality.	The lees and run structure were defined following extensive and iterative consultation and specified set-up planning for the simulation. It should also be recognised that the simulated transfers were conducted by independent marine professionals, experienced in pilot transfers and used real life procedures in a realistic timescale. The runs were also scrutinised and witnessed by neutral observers from the MCA and Trinity House as well as the observer representing the Port of Tilbury and London Gateway. The final geometry of the transfers, including order and transfer course was organised by the coxswain of the pilot cutter according to the conditions, which is exactly as happens in reality at the NE Spit as well as every other pilot station in the country. This is a fundamental principle of pilot transfer which was addressed during the simulation by the independent professionals, the simulator provider, and by those observing.
	PLA-033	**Ladder Assignment:** The Applicant has commented that the ladder assignments had no bearing on the safe conduct of transfer operations during the study. However, the PLA and ESL would like to emphasise the relationship between ladder assignment and the subsequent lee. The choice of ladder assignment will have a major impact on the lee requested. The Applicant's comment that ladder assignments did not impact the safe conduct of transfers suggests that the Study has underestimated the importance of two factors which the PLA and ESL consider as key safety factors in pilot operations: ladder assignment and subsequent decision on lees. The study does not state which ladders were used for which runs. However, since in the opinion of the PLA and ESL there are numerous runs which demonstrate lees which would not happen in reality, the PLA and ESL infer that some of these unusual runs could have occurred due to incorrect or unusual ladder assignment. If the information on ladder assignment had been included in the Study, the PLA and ESL would have been able to provide further information on this and on their usual working practices in this regard.	The intimate relationship between ladder assignment and lee is a fundamental and universally accepted normal in pilot transfer operations. The Applicant can confirm that ladder assignment and lee creation was considered in detail by the independent practitioners conducting the simulation and dictated by simulation participants, as is the practice at every pilot station on an international basis. These considerations had no material effect on the safe conduct of transfer operations during the simulation study As can be seen from the feedback, the independent mariners and observers who were present reported no suggestion that ladder assignment and lee creation was influenced. Further, the IP has not provided any example of lees created during the study, where they considered transfers would not have occurred, or identified simulation runs where transfers might have been conducted differently, or, most importantly, where the safe outcome of the transfer would have changed.
	PLA-034	**Run Times:** These parameters were agreed by the participants and not local operators. The detail of run specific transfer times are not recorded in the report. This concern was expressed in our initial comments to the draft report. The PLA and ESL have explained that more time needed to be allowed for the cutter to be alongside each vessel, reach the bridge and establish situational awareness; the times proposed by the Applicant might be an acceptable minimum but are not realistic on average. It is not clear to what extent these comments have been taken into account.	The Applicant can confirm that the run times and plan was discussed with all participants, and increased based on feedback from the first day.
	PLA-035	**Emergency/operational difficulties** The Applicants response does not address the PLA's and ESL's concerns and the issues raised by both parties in their original response in relation to emergencies and operational difficulties remain.	The Applicant notes this response from the PLA and ESL regarding the 2019 PTBS report and has therefore provided further clarification in this document.
	PLA-036	**Launch Operation:** ESL and the PLA made it clear that for launch representation to be accurate, there would need to be participants with relevant experience of having worked in the area transferring pilots, along with the role of vessel masters being represented by participants unfamiliar	The objective of the simulation was, as has been described elsewhere, to test feasibility of operations with a range of independent mariners with a varying range of familiarity.

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		with the area, as is typical in real-life scenarios. The PLA and ESL are concerned with the use of non- familiar participants in particular the fact that vessel masters were all played by professional pilots. The use of 5 coxswains who are unfamiliar with the local operation has been assessed as a positive step toward impartiality, which the PLA and ESL do not fully disagree with. However, when considering factors such as our strong disagreement with a high number the lees requested and the relative ease with which severe met ocean conditions were operated in the PLA and ESL believe that this is an unrealistic representation of pilot launch operations at the NE Spit. The lack of relevant representation being present at the study and the disregard for current best practices means it is totally unacceptable to make the assumption that the current operation's scheduling will be unaffected.	Given the success of the simulation using expert mariners with limited local knowledge, it can be reasonably assumed that a greater level of local knowledge will lead to a greater level of success. Comments from independent mariners on the challenging conditions, difficulty in vessel handling and complexity of multiple vessels all speak to the fact that the run scenarios put forward tested thoroughly both the mariners and the available sea room. ESL have made it clear that they can and do operate safely in severe metocean conditions – the vessel plots from such transfers would also bely the challenge of those transfers but would not detract from the fact they were carried out safely.
	PLA-037	**Repeated Runs:** If all runs apart from 'full success' runs were repeated it would have been prudent to repeat runs that marginally succeeded as well as those that marginally failed. Runs 5, 9, 10, 15, 16, L3P, NEA2 and NEA4 all have vessels that are within 0.1nm of the marginal criteria.	The success/marginal/fail criteria, and approach in reassessing runs were consulted upon beforehand. The rate of pilot transfers completed without material impediment is such that repeating further runs was not deemed necessary by HR Wallingford in meeting the objectives of the study.
	PLA-038a	**Margate Roads Anchorage:** The eastern boundary of the Margate Roads anchorage is approximately 350m west of the inner boarding diamond, this is the no anchoring boundary, and it is not uncommon for vessels to anchor in close proximity to this boundary, as demonstrated in the NRA (section 3.6.6 – Anchorages Figure 13). We would suggest 3nm (5556m) would be closer to a centre point of the Margate Roads anchorage.	Traffic within or proceeding to/from the Margate Roads anchorage was simulated in the 2019 PTBS. HR Wallingford as the simulator provider used traffic densities and flows from 3 years of AIS data as the basis for simulating traffic both at Margate Roads and the wider NE Spit area. At the set up day, it was agreed to use higher levels of background traffic than was shown by the AIS data in order to allow for future traffic growth. When compared to the AIS animations submitted by the Applicant at Deadline 8 it can be seen that the vessel densities simulated for single runs (1hour) are either greater than, or comparable to, the vessel densities over a 24 hour period in the 'busiest day (pilotage)' simulations. Analysis of vessels anchoring in Margate Roads over the 3 years of AIS data failed to show any occasions where all the sea area would be unavailable for transfer purposes. To date the PLA and ESL have not provided any examples of traffic density where the Margate Roads sea area has been needed for transfers to occur in practice. Nevertheless, an examination of the track plots provided by HR Wallingford for the 2019 PTBS show that only 1 of the 159 transfers was conducted within the Margate Roads anchorage area. This example occurred on the very southern boundary of this area. In short, Margate Roads was considered during the 2019 PTBS and traffic data analysed for it, but there was no need to use the anchorage during simulation, because there was sufficient sea room existing within the NE Spit pilot transfer area, with the proposed wind farm extension in place, even with multiple and complex transfers occurring and increased background traffic density.
	PLA-038b	The closest point of the TEOW boundary to the Margate Road no anchoring boundary is approximately 3.5nm (6482m) not the suggested 5nm (9260m). By using a centre point for the anchorage rather than its boundary the report gives the impression of more 'useable' sea space than exists in practice. It is common for vessels to anchor in close proximity to the no anchoring boundary which can render the anchorage unfit for transfer purposes. The 2017 Simulator study consistently placed vessels close to this boundary which was a more robust representation of reality and consequently lead to a marginal run. By not fully including the Margate Roads anchorage and its boundaries the HRW study has overestimated available sea room. The presence of ships in the anchorage would impact on a Master's decision to take a particular route to take to or from the boarding and landing position.	
	PLA-039	**Tongue:** To clarify, in saying that "these successful runs aided the overall conclusion that the Tongue boarding position will be unaffected and will not require relocation", the PLA and ESL are not supporting the applicant's assertion that it has proved the Tongue boarding position is unaffected. Three runs, one of which is a repeated marginal run, is not sufficient to draw a meaningful conclusion. The fact that careful mitigations would be required before considering 400m vessels means that these runs cannot support a conclusion that the Tongue will be unaffected.	It has been stated on many occasions by the PLA and ESL that the pilot diamond is not a target but identifies a general area of operation. The results of the 2019 PTBS demonstrated that pilot transfers could safely occur in proximity to the existing charted position. It may be that, following construction, it would be prudent to move the charted position of the Tongue and the draft DCO allows for compensation to be agreed for that. However, the Applicant considers that the use of the general boarding area would be unaffected and there was no indication that these activities would have to occur 2.5nm north of the project, as suggested by the PLA and ESL in previous submissions. Mitigation is required for the activity of a large vessel making passage, immaterial of the presence of TEOW, particularly given there is no record of vessels of this size currently using the area.

Consultee	Ref	Comment	Applicant response
	PLA-040a	**Conclusion:** The lack of local operator participation means that a highly precautionary approach should be taken when considering the conclusions of this study. The representation of boarding and landing practices at the NE Spit pilot station are very limited. The Applicant suggests that the pilot cutter service will not be impacted by the extension. Given ESL's and the PLA's experience in this area, and the deficiencies in the simulations as described above, they cannot share the Applicant's conclusions. The Applicant failed to incorporate ESL's working practices in this simulator study, as they did not believe it necessary. ESL has a considerable collective experience of the offshore area that was the subject of this study, because of its daily operations in the area. Unfortunately, that continual presence in the area – by a small but highly-trained staff – was precisely why ESL was unable within the notice period given to withdraw coxswains from the roster to send to the simulator study to represent both ESL and the PLA	In rejecting the conclusions of the 2019 PTBS on the basis that they were not involved, the PLA and ESL disregard the experience and professionalism of the operator (who the IPs themselves suggested) and the independent mariners who participated. The Applicant's position is that the reliability of the HR Wallingford simulator and the value of the qualitative views of the independent mariners (both as requested by IPs) is not fettered by ESL not being in attendance. Had ESL attended, they would have no doubt added valuable insight into their operation, however the fact this did not occur does not detract from the conclusive outcomes from the PTBS with regard to sea room and navigational safety; conclusions that were also reached in the 2017 PTBS study. Pilotage is not an operation unique to ESL, and whilst the Applicant fully accepts that they may undertake some transfers slightly differently to how it was carried out in the simulation, the fact that independent mariners, generally unfamiliar with the area and operating in 'limit state' conditions, where able to safely undertake these activities provides a great deal of precaution and confidence in the conclusions of the 2019 PTBS. At a broad scale, the key practices of ESL, mostly notably bringing vessels into the NE Spit by having them 'dip down' and their confirmed prioritisation of serving non-piloted vessel first, were replicated. To consider that the PTBS did not reflect the practices in question suggests that pilot transfers at the NE spit are so completely different to any other part of the country as to be incapable of being simulated by other participants. There is no evidence put forward by the IPs as to why this is the case, and the Applicant, supported by the views expressed by the independent mariners, considers that beyond small operational differences, the act of pilotage is largely the same around the world. Simply put, different does not automatically mean less safe, and it has not been made clear what part of ESLs operation would lead to greater risks or impacts on safety from those seen in the PTBS, or why they, as the experienced local operator, would operate in a less efficient or less safe manner than the participants in the simulation. There has been no compelling reason put forward as to why ESL participation or which 'relevant considerations' would have led to a materially different conclusion on sea room or safety of navigation.
	PLA-040b	How ESL conducts its operation has a significant impact on navigational safety in the surrounding area. To not fully represent this in the simulator study, particularly in regard to making a safe lee, undermines the realistic presentation of vessel behaviour at the NE Spit pilot station. Therefore, the disconnect between the simulated practices and reality are a point of ongoing concern.	
	PLA-040c	As stated in the PLA and ESL Deadline 6a submission at page 4, there needed to be timetable flexibility when trying to organise a further simulation study. The applicant postponed their study by approximately 2 weeks which did not change the impact it would have had on ESL's operation. This was the main accommodation offered in terms of timetable, before the applicant felt it was necessary to continue without ESL/PLA involvement. Whilst we appreciate the simulator availability may have been a limiting factor it seemed to take priority over offering key participants reasonable opportunities to participate in the study.	
	PLA-040d	Whilst simulator studies are common practice within the shipping industry their effectiveness is limited if the input is inadequate. The simulator output can only reflect the input of the operator and participants. In this case, the input was not reflective of the practices in question which has limited the accuracy and reliability of the output.	
	PLA-040e	The PLA and ESL fundamentally disagree that the outcomes of this simulation support the ALARP conclusions of the NRA/NRAA.	The Applicant notes the PLA/ESL's position and would reiterate that the results confirm that pilotage acts may continue without meaningful impediment, a conclusion that has been supported by independent mariners and HR Wallingford as independent simulation operator. The conclusions of 2019 PTBS offers no compelling evidence that would go against the conclusion of ALARP in the NRA/NRAA and in fact, demonstrates that the hazard scoring is highly precautionary.
	PLA-040f	At the end of the examination process the PLA and ESL agreed with the MCA's final position (as stated in the table appended to their Deadline 8 letter to the Planning Authority) that we are unable to accept that ALARP has been reached. Whilst the PLA and ESL acknowledge that the additional simulation results demonstrate that boarding and landing may be feasible with the extension in place, the inputs into the study fail to take into account relevant considerations, and it is nowhere near robust enough to demonstrate that boarding and landing can continue without unacceptably increased risks.	The Applicant is disappointed that, having agreed to the PLA and ESLs repeated requests to undertake additional simulation, using a facility the IPs themselves suggested and addressing the wide range of concerns raised after the 2017 PTBS, that the IPs chose not to attend and have subsequently concluded that it was 'nowhere near robust enough'. It is simply not clear to the Applicant how a study that took such a precautionary approach to metocean conditions, traffic, number of consecutive transfers and use of unfamiliar mariners, testing the limits of the available sea room, in a world-renowned simulation facility, could be considered 'nowhere near robust enough'.

Consultee	Ref	Comment	Applicant response
			The acknowledgement that boarding and landing 'may be feasible with the extension in place' is welcomed, but the Applicant cannot agree that the results of the 2019 PTBS, the 2017 PTBS, both CRM's and the conclusions of the NRA and NRAA indicate anything other than that the increase in risk has been reduced to ALARP.
COS	COS-001	**Navigational Risk Assessment:** The UK Chamber of Shipping welcomes the additional Collision Risk Model (CRM).	n/a
	COS-002	The Chamber expresses its continued concern that an increase in risk of collision is not deemed to be "significant" within this application, especially when it coincides with a reduction in sea room. It is understood by all that a reduction in sea room, which subsequently reduces the navigable waters for vessels to safely manoeuvre, will increase the risk of collision. The CRM report indicates that this risk, using a data set provided for one month's worth of traffic, increased by 4% and is "not considered significant" by the Applicant. The Chamber disagrees that these increases are "not considered significant", nor that the risks associated with project can be considered to be ALARP. Furthermore, whilst the Chamber support the need for quantitative data to be provided within this application, it has been the request of IPs on a number of occasions to ensure that qualitative data is recognised in conjunction with the quantitative data and is submitted in all relevant documents.	The Anatec report states that - *Based on the results of the assessment, it was estimated that a vessel would be involved in a collision once per 47 years assuming base case traffic levels and patterns, rising to once every 46 years following construction of the extension. This represents a rise of approximately 4%. Within the context of baseline incident rates this is not considered as a significant increase. It is noted that the lifetime of the projects will be consented to be 30 years and although the modelling does not give any indication as to how soon an incident may occur given the overarching return period estimated it may not occur within that 30 year lifetime.'* The report is not a full impact assessment and does not deem risk to be significant (or not) under EIA terms. The Applicant can confirm that the CRM was undertaken to validate the findings of the original CRM which accompanied the application given the concerns raised regarding the use of December AIS data, and to represent the impact on risk following the introduction of the SEZ. The findings demonstrate that the increase in collision risk from the original CRM (which informed hazard scoring in the NRAA), can be considered highly precautionary and this complements the other qualitative datasets which informed the wider NRAA and conclusion of not significant. It should be noted that in the hazard workshop, baseline risk was considered by IPs to increase by 100% with the introduction of the project, in comparison to a 4% increase for the same area identified in the Anatec CRM. This supports the Applicant's position that the hazard scores in the NRAA are extremely precautionary and therefore can be relied upon. It is important to note that the conclusion of significance, or in the context of the NRAA, ALARP, also correlated with the Port of London Authority's assessment submitted during Examination and the conclusions of the HAZID workshop.
	COS-003	The CRM report uses AIS data from September 2017, and whilst being identified by Estuary Services Limited as the busiest month, we do not agree that this AIS data provides an accurate picture of traffic density experienced in these waters. Due to the lack of radar data provided, a large number of recreational craft and fishing vessels are unaccounted for. These vessels also have an impact on the density of traffic in the area and subsequently the additional risk to safety of navigation in the vicinity of this proposed development.	The limitations of the data were clearly defined within the report which should be considered alongside the NRA which does address matters relating to non-AIS traffic.
	COS-004	**Further Navigational Simulation Report:** The UK Chamber of Shipping was not in attendance during the navigational simulations. The Chamber reviewed the specifications beforehand and no comments were provided. Additionally, we offered to assist with the sourcing of mariners should it be needed to ensure independent involvement and provide varied experience and knowledge of the area.	The Applicant welcomed and appreciated the offer made by Chamber of Shipping to provide independent mariners. The Applicant was able to source experienced independent mariners with a range of familiarity of the local area from completely unfamiliar through to pilotage experience of the area.
	COS-005	The Chamber welcomes the simulation report and the decision to use coxswains and pilots that were unfamiliar with the area as this provides a more realistic picture of the conditions on board many commercial vessels picking up Pilots and transiting the area. We note that there are a number of simulated runs that encountered minor proximity breaches and that most of runs were only conducted once. Where runs encountered breaches, we believe additional simulations would have provided clarity and that these should have been conducted.	The Applicant welcomes the CoS feedback and can confirm that marginal runs were repeated

Consultee	Ref	Comment	Applicant response
	COS-006	In response to the runs carried out on Day 5, it is important that planning for the future and the possible increase in vessel size is accounted for when considering this application and the Chamber supports the need to simulate runs with vessels that do not currently, but may in the future, use this sea area and associated pilot boarding grounds.	The Applicant welcomes the CoS view regarding the appropriateness of simulating the larger 'future baseline' vessels.
MCA	MCA-001	**Navigational Risk Assessment:** The MCA recognises that the purpose of the collision assessment of the proposed extension was to investigate relative change in likelihood scores between the baseline and inherent risk scores, not the relative change in risk as paragraph 3 of the document infers. To assess the relative change in risk would involve assessment of many other elements, of which this collision assessment is only one. The report recognises that one month's Automatic Identification System (AIS) data has been used in the assessment and notes that data on non-AIS vessels and near-miss incident data has not been included.	The Applicant agrees that the report considered the relative change in collision likelihood.
	MCA-002	The MCA acknowledges that the CollRISK model used by Anatec Ltd has been used for other offshore wind farm Navigation Risk Assessments (NRA), however when comparing the results against Hornsea One and Two sites (Appendix 42, paragraph 14), it should be noted that these two wind farms are more than 50 nautical miles offshore where there are different vessel types in the area, different traffic patterns and densities, including where pilot transfers and pilotage operations do not take place. Collision risk is normally higher closer inshore where there are greater traffic densities and more constricted traffic routes, and it can be expected therefore, that the relative increases in likelihood scores to be greater for wind farms closer inshore. The applicant claims that collision risk increases for Hornsea One and Two are "far in excess of those identified for TEOW" (Appendix 42, paragraph 14), however a degree of caution should be taken with this statement as the two sites are not suitable for comparing collision risk.	Rampion offshore windfarm is also included within table 5.2 which is closer inshore. In addition, it is not possible to include information which is not publicly available, noting that this applies to many pre Round Three projects which were also closer inshore. The East Anglia projects have not been included within the table as they were consented using a cumulative (southern north sea) approach rather than considering smaller project areas, therefore they are not directly comparable. Given the baseline traffic levels can be busier near-shore, NRAs (and this collision report) considered the change as well as the pre and post values. The change in values are used as an illustrative comparison to demonstrate that regardless of baseline conditions changes to density, routeing and risk can be mitigated and consented.
	MCA-003	The MCA is content with the Marine Accident Investigation Branch (MAIB) data and that four examples of collisions have been highlighted including one in which action was taken to avoid a collision. Also worthy of mention is the Maersk Nottingham incident in 2009 where, although not a collision incident, the vessel suffered engine failure, and without the assistance of the Thanet wind farm construction tugs she would have drifted into the wind farm site. MCA notes that the report recognises that data for non-AIS equipped vessels is not included and, therefore, non-AIS equipped vessel traffic is underrepresented.	Reference to this incident was included as part of the risk assessment considerations in the NRA (section 8.4.1) and therefore has been factored into the hazard scoring and the conclusion of ALARP. In terms of incident data for non-AIS vessels, RNLI data was used to supplement the MAIB reports.
	MCA-004	The MCA's concerns on navigation safety risk, as highlighted in our response to the Examining Authority for Deadline 6, have not changed. The collision assessment on likelihood scores would normally feed into the NRA along with other elements such as allisions, groundings, qualitative data from stakeholders and risk control measures. During examination, the figure used for projected increases in traffic densities was challenged by stakeholders as being somewhat arbitrary, which raises the question on whether the 10% figure is appropriate for this collision assessment. Overall, there are still too many outstanding elements of the NRA not agreed, for MCA to confirm that this assessment addresses and satisfactorily assuages our concerns.	The Applicant notes that the 10% future baseline figure has been subject to examination, and also subject to previous Applicant submissions which confirmed (through analysis of Department for Transport data) that the 10% future baseline assumption is appropriate and conservative with regards vessel arrivals. Concerns have been raised by LG/PoT in particular regarding a future baseline for vessel freight (tonnage) and the risk that 10% may not be adequate, however given there is demonstrably a lack of linear relationship between vessel arrivals and freight (tonnage), and it is the former that is of relevance for vessel density, the 10% future baseline is considered appropriate and accords with DfT data. The updated collision risk modelling was undertaken to further understand the benefit of the introduction of the SEZ, and to provide validation of the existing collision risk modelling. Whilst the need for stakeholder liaison and ideally consensus is recognised, the Applicant would note that whilst there remain outstanding areas of disagreement between the Applicant and commercial entities within the region, significant weight should be given to varied evidence provided by the Applicant, all of which concludes consistently that the increase in collision risk is low, that

Consultee	Ref	Comment	Applicant response
			there is sufficient sea room for continued navigation and pilotage, that the inputs into the NRA and NRAA are precautionary and that the conclusion of ALARP can be relied upon. The remaining elements that are not agreed relate primarily to concerns regarding commercial impacts. Whilst operational viability is an important concern that should be appropriately addressed, it should also be seen as a separate line of enquiry to navigational safety, the conclusions of which are evidentially that the project will not result in a significant increase in risk and that those risks are ALARP.
	MCA-005	**Further Navigation Simulation Report:** The MCA does not stipulate simulation exercises as part of its guidance, however, the need for additional assessments should be adequately weighed and undertaken in order to address concerns raised by Interested Parties (IP). The MCA attended the simulation workshop as observer and witnessed multiple runs over three consecutive days' of exercises. It was noted that the trials utilised experienced pilots, although from different operational area. As noted above, MCA guidance does not explicitly require simulation studies, since, as well recognised by the maritime industry generally, there are limitations to simulation studies to achieve a holistic qualitative assessment compared to the real environment.	The MCA representative attended the simulations and was given full and free access throughout. The MCA positive guidance on simulation was well received and analysed by the Applicant, before designing the simulation. The absence of an explicit requirement for simulation studies is recognised. However, simulations are a recognised and accepted method for achieving holistic qualitative assessment and the MCA has been a full party or observer to many simulations elsewhere including those conducted by some of the IPs for other projects. Whilst not a requirement, the MCA's own guidance (2013 guidance to OREI developers) in Table 18 places bridge simulation as the second highest tier of evidence behind sea trials. This table also confirms that bridge simulation is at the upper end of 'human involvement'. The guidance then defines the use of bridge simulation, stating 'For critical risks or significant investment decisions on risk control options it may be necessary to extend the assessment to simulation using full bridge simulators. A number of UK marine training and research establishments, together with some universities, have such systems.'. This very clearly places bridge simulation as a tool to assess the most critical risk or concerns. The Applicant considers that the weight placed on this part of the assessment by the MCA should be significant, in line with their own guidance.
	MCA-006	MCA observed that for most part of the simulation exercises, main and affected IPs were absent. So, the applicant's simulation exercises weren't quite subject to nuanced cross verification and validation by the directly affected parties involved in pilot transfers.	The Applicant would note that both Trinity House and MCA recognised the value in introducing independent expert mariners to the navigation simulation to ensure that mariners arriving from different areas find operations as feasible as mariners with greater local knowledge. It is also worthy of note that the 2019 PTBS specification definition was subject to cross verification and validation by the directly affected parties during three rounds of consultation, and as such the absence of further cross verification and validation during the practical navigation simulation exercise is not considered to materially affect the results or conclusion, that all 159 pilot transfers simulated in limit states were completed safely and that the navigation simulation was considered by the independent operator (HR Wallingford) adequate to address the objectives of the study.
	MCA-007	Our concerns remain that there has been a failure to obtain IP agreement regarding the risk to pilots, along with the other NRA related aspects, including the list of embedded and additional risk controls measures as detailed in MCA responses throughout the examination, and the acceptability of the final risk scores as ALARP. It is MCA's view that the simulation report is not an alternative to the NRA and just addresses one aspect of what is being validated – the pilot transfer operation, although professionally undertaken.	It is the Applicant's understanding that reaching agreement with other stakeholders, whilst preferable, is not a requirement of the MCA's guidance. It is for the MCA to provide feedback that takes account of expertise and knowledge from across the board – inclusive of those acting on behalf of the Applicant and those opposing the development. One of the agreed objectives of the 2019 PTBS was to consider whether a further amendment to the NRA was necessary; the conclusion reached following safe completion of 159 pilot transfers in a range of limit state metocean and vessel density conditions was that the NRAA was suitably precautionary and further amendments were not necessary. The 2019 PTBS report is not presented as an alternative to the NRA, however it does address and validate some of the key assumptions in the NRA and NRAA around impacts on pilot transfers. The recognition that the pilot transfer operation was undertaken professionally, combined with the participants representing significant pilotage operations within other major UK ports, provide confidence that the conclusions drawn are robust. Whilst agreement has not been reached with the commercial pilotage operators, or IPs with commercial interests in either the pilotage operation or regional ports, MCA and the Secretary of State can be confident that the potential risks to safety have been assessed at an unprecedented level, using a broad range of highly experienced independent

Consultee	Ref	Comment	Applicant response
			technical and Master Mariner expertise, with the unequivocal conclusion drawn that there is no significant increase in risk and that the risks associated with the project are ALARP.
TH	TH-001	**Navigation Risk Assessment:** Trinity House welcome the additional Collision Risk Model (CRM), which has been prepared for the Red Line Boundary (RLB) and the inclusion of the Structure Exclusion Zone (SEZ).	The Applicant notes this response and welcomes Trinity House's appreciation of the purpose for the additional CRM exercise undertaken by an independent technical specialist (Anatec).
	TH-002	Trinity House, throughout the whole Examination process, have maintained the position that qualitative data should also be recognised alongside quantitative data when assessing risk. As stated in the introduction on page 1 of the report "... collision risk has been assessed on a quantitative basis both pre and post TEOWF... ", Trinity House would request that any qualitative data previously submitted is used in conjunction with the new CRM report when reassessing the residual risk of TEOW including the SEZ.	The Applicant can confirm that it is not proposing a new CRM report, but can confirm that meetings were held with IPs to specifically inform the qualitative assessment of the NRA addendum during the examination, which it is understood was welcomed by Trinity House.
	TH-003	The report was carried out using AIS data for September 2017 and does recognise the limitations of this timeframe and data set. We would wish to highlight this data set is purely AIS and does not take into account Non AIS equipped vessels. Also the limited weather conditions experienced in the restricted timeframe.	The limitations of the data were clearly defined within the report which should be considered alongside the NRA which does address matters relating to non-AIS traffic. The Applicant recognised the limitations of a month of AIS data and undertook surveys which were MGN compliant. In addition, a further 18 months of data were also subject to analysis, and confirmed the initial NRA baseline to be appropriate, representative of existing conditions, and adequate for the purposes of EIA. The Applicant would also note that the Sept 2017 period was representative of wind strengths across the spectrum of conditions experienced, inclusive of Storm Eileen (60 knot wind)).
	TH-004	As the area between the windfarm and the Kent coast is an area of general navigation any reduction in the navigable space by TEOW will increase the risk of collision. This has been shown in the CRM report to be approximately 4% based on a data set for just one month and the applicant state in their final point 15 that the increase "..is not considered significant." Trinity House acknowledge that there is an increased risk associated with all projects and it is for the Examining Body and the Secretary of State to decide if the increase is acceptable.	One month of data has been considered however the 4% is an annual change and considered to be within historical fluctuations of traffic values. Furthermore the risk is defined as acceptable by being ALARP, which is the conclusion.
	TH-005	**Further Navigation Simulation Report:** Trinity House were in attendance at the simulation for some of the days and witnessed some of the runs being carried out. As stated in the report, we raised the issue of how mariners will measure their distances from the windfarm compared to how the scenarios were being run.	The Applicant welcomes Trinity House's positive contributions and availability to attend the simulation exercise.
	TH-006	In the initial simulation we raised concerns that there was an over reliance on local knowledge and this was addressed by using experienced mariners from other ports. However at times the lack of local knowledge for procedure and operating in this area was apparent during the new trials.	The Applicant welcomes Trinity House's acknowledgement of the value of independent experienced mariners. The Applicant recognises Trinity House's observation regarding a lack of local knowledge, however would also note that this did not materially affect the outcomes of the simulation. The 2019 PTBS should also be seen as complimentary to the 2017 PTBS which was undertaken using experienced local practitioners in an IP training facility and concluded that all pilot transfers completed safely, the combination of which represents an unprecedented level of assessment, the conclusions of which can therefore be considered robust.
	TH-007	We recognise that most of the simulated runs were only carried out once and some had marginal breaches of the set criteria. In the limited time available the runs were not run again so it is not apparent if the marginal fails, or passes, would get different results using other personnel. This is not purely an issue for this simulation but with simulations for all	The Applicant recognises the general observation but would note that in this specific case marginal runs were in fact re-run with different personnel, and that most runs were variations on a theme with an increasing level of complexity. That all pilot transfers were completed safely, under a combination of different practitioners in demonstrably limit state conditions provides confidence in the conclusions drawn.

Consultee	Ref	Comment	Applicant response
		projects being completed within a restricted time frame and results should be considered with this in mind.	
LGP and PTL	LGP-001	**Collision Risk Assessment** ***Failure properly to consider growth:*** The Ports maintain that the 10% increase in traffic utilised for the purpose of the CRA is insufficient to account for future traffic growth for the full period during which the TEOWF will be operational. Section 5.3 of the CRA suggests that the "flat 10% increase" is "in line with that assumed for the larger majority of NRAs undertaken for North Sea offshore renewable projects". This fails to recognise the particular characteristics of the area in the vicinity of the TEOWF which is subject to extensive new port development (including that at DP World London Gateway and Tilbury2). Such project-specific characteristics were the subject of a number of the Ports' representations throughout the course of the Examination and the CRA's reference to "the larger majority" of NRAs is both symptomatic and representative of the Applicant's failure properly to consider local context for growth in the assessment of the TEOWF.	The Applicant has provided a more comprehensive response to this matter in Annex A. In brief the Applicant would note that the matter of future baseline has been addressed within oral and written submissions, most notably the Applicant provided a detailed analysis of Department for Transport data at Deadline 7. The analysis concluded that whilst increases in freight (tonnage) may fluctuate with levels above 10% there is not a linear relationship between freight tonnage and vessel arrivals. The established trend is for larger vessels, and for reductions in certain inshore freights and cargos, the combination of which offsets a potential increase in vessel arrivals. Analysis of DfT data and published statistics clearly demonstrates that an assumed 10% increase in vessel arrivals (the relevant metric when considering increases in vessel density and collision risk) is appropriate and conservative. Reference has been made to previous submissions that mistakenly assume a linear relationship between freight (tonnage) and vessel arrivals rather than the more contemporary and detailed analysis submitted to the examination. The submissions made by PoT/LG in this regard (REP5-071) are therefore considered to not represent an accurate portrayal of long term trends in vessel arrivals, which is of particular relevance when considered in the context of port developments such as London Deepwater Gateway which specialise and pre-empts trends towards larger vessels to facilitate more efficient trade.
	LGP-002	In this regard the Examining Authority's (ExA's) written question 3.12.13 [PD-019] which pertained to 'allowances for traffic growth in collision risk modelling: NPS Ports policy compatibility' referred to advice set out within the National Policy Statement for Ports and the implication "that the combination of a geographic shift in demand for port capacity towards the south east together with forecast GB growth rates for ports capacity when taken together suggest that trends extrapolated from historic traffic on the Thames Estuary may not provide a sound basis for forward planning for ports capacity and effects of ports going forward". The Ports responded to this topic throughout the course of the Examination and made a number of submissions in respect of growth maintaining that whilst the growth assumptions which informed the assessment of the project may appropriately represent the growth in port throughput for the UK as a whole, they were not reflective of the ports located in the Thames Estuary. See in particular the following representations made by the Ports: [REP2-050]; representations made at issue specific hearing 5 (as summarised in [REP3-070]); [REP4C-016] (including the HR Wallingford Report at Appendix 1); [REP6-105]; and [REP7-042].	
	LGP-003	The Ports also refer to table 85 of the Marine Management Organisation's MMO1127: 'Future analysis for the North East, North West, South East and South West marine plan areas' document dated June 2017 which was submitted to the Examination by the Applicant in Appendix 7 to its Deadline 5 submission [REP5-012]. Table 85 sets out assumptions and impacts under the future scenarios for ports, shipping, dredging and disposal in the south-east marine plan area and recommends assumed annual growth rates, in terms of freight tonnage, of 1% between 2017 and 2027 and 2% between 2028 and 2036. This equates to a growth assumption of 29% for the period of 2019 to 2036, notwithstanding that 2036 represents only 17 years into the 35 year 'Reasonable Planning Horizon' suggested by the EXA as being representative of the likely operational lifetime of the TEOWF on Page 2 of their ISH2 Action Points document [EV-003]. Even if the lower growth figure of 1% was utilised for the remaining 18 year period (2036 to 2054), growth over the full Reasonable Planning Horizon would be in the order of 47% (or 60% if compound growth is considered).	

Consultee	Ref	Comment	Applicant response
	LGP-004	Furthermore, in addition to predicted growth in the South East region as a whole, we note the Applicant's response to the ExA's written question 3.12.13 [REP6-026] which highlights a decline of trade at the Port of Felixstowe of 15% between Q4 2017 and Q4 2018 resulting from the shift in trade from the Port of Felixstowe to DP World London Gateway. While this may not be relevant to traffic growth in the region as a whole, it is significant that the shift from the Port of Felixstowe to DP World London Gateway would result in greater use of the shipping lanes relevant to the objections made during the Examination of the Application by the shipping and navigation parties. Thus, whilst the Ports acknowledge that average ship sizes are increasing, they do not believe that such increases will be sufficient to translate the levels of background freight growth in the South East region predicted within the MMO1127 document and Ports NPS, alongside the significant shift within the South East towards Thames-based ports, to just 10% vessel traffic growth. 2	
	LGP-005	In view of the above, the Ports are of the view that the 10% future vessel traffic growth figure assumed for the purposes of the CRA does not provide a suitably robust assessment.	
	LGP-006	The Ports also highlight that the CRA demonstrates that an increase in vessel traffic results in a disproportionately greater increase in risk (section 5.3 of the CRA[sic] provides a comparison of 2017 traffic levels without the TEOWF and the future traffic levels without the windfarm extension and states that a 10% increase in vessel traffic results in a 21% increase in risk). This demonstrates that the level of risk is somewhat sensitive to increases in background traffic. Given the uncertainty regarding the 10% future traffic growth assumption (as indicated by the concerns expressed by Interested Parties, and above), the Ports are of the view that in order to be considered robust, the CRA should, at the very least, have included a 'sensitivity test' of higher future vessel traffic growth levels. The Ports contend this is critical because any increase in risk as a result of the TEOWF (suggested by the CRA to be 4%) must be considered against the level of baseline risk. Whilst a 4% increase in risk may be acceptable in an area which is subject to low baseline risk, it may be entirely unacceptable where baseline risk is already high. The Ports contend that the CRA has not robustly assessed future baseline risk and therefore cannot be relied upon to consider the effect of additional risk resulting from the TEOWF.	
	LGP-007	***Modelling process:*** Aside from the matter of appropriate vessel traffic growth assumptions, the Ports note that the modelling process for the CRA did not take account of anchored vessels (see the 4th paragraph of section 6, page 17 of the CRA) and little justification is provided for this approach. The Ports consider that it is appropriate to highlight that the Applicant's original Navigation Risk Assessment (NRA) [APP-089] reported a marginal failure within the 2017 simulations due to proximity to a vessel anchored at the Margate Roads Anchorage (see page 74 of the NRA). In addition, the Ports note the comment of one independent mariner involved on Day 3 of the September 2019 simulations (as reported in Annex D of the Bridge Simulation Report dated 19 September 2019) that "*I would not have been as comfortable if a vessel was anchored in the deepwater anchorage*". Thus, the absence of consideration for anchored vessels further draws into question the robustness of the conclusions of the CRA. Vessels at anchor are clearly a material consideration for the purpose of safety of navigation and the Ports consider that the omission of such vessels is detrimental to the validity of the assessment.	The Anatec report focuses on statistical changes to frequency of route based or in transit vessels in relation to collision risk.

Consultee	Ref	Comment	Applicant response
	LGP-008	In addition to the views expressed above, the Ports also defer to the views of those Interested Parties responsible for navigation and pilotage operations in the vicinity of the proposed development3 regarding the majority of technical matters relevant to the CRA. For the avoidance of doubt, the Ports have not been able to refer the CRA to their technical navigation specialists, HR Wallingford, as their appointment ended at the close of the Examination. Had the CRA or the Second Bridge Simulation Report been produced during the course of the Examination (as the Ports suggested should be the case) then the Ports would have been able to refer both to HR Wallingford for assessment and analysis.	The Applicant notes this response.
	LGP-009	**Bridge Simulation Report** As outlined above for the CRA, the Ports have not referred the Second Bridge Simulation Report dated 7 October 2019 (referred to here as the second PTSB report) or the Second Bridge Simulation Study Specification and Inception Report dated July 2019 (referred to here as the Specification) to their technical navigation specialists, HR Wallingford for technical input. This was not possible due to (a) HR Wallingford's appointment having ended at the close of the Examination (as explained above); and (b) the tight timescales in which such feedback was sought (in particular for the Specification which was received by the Ports on 16 July 2019 with feedback sought by 30 July 2019).	The Applicant would note in response to the LG/PoT submission that the navigation simulation specification was discussed and examined at length, both in oral and written submissions, with specific commentary requested by the Examining Authority at Deadline 6. Subsequent revisions were provided to IPs with the intent of facilitating 4-6 week consultation periods, which is in line with standard practice and formal consultation exercises.
	LGP-010	The review and subsequent feedback which the Ports offered the Applicant on the Specification in July 2019 was therefore of a non-technical nature. Such feedback was limited to the accurate reporting of previous representations; discussion of appropriate future vessel traffic growth assumptions; and procedural matters. The procedural matters included seeking clarification as to the purpose and scope of additional simulations and seeking to ensure that the additional simulations and reporting thereof was undertaken in an independent and un-biased manner.	
	LGP-011	Whilst the Ports have an in-depth understanding of matters such as future growth, the Ports do not undertake navigation and pilotage operations and therefore do not have in-house expertise in these areas. The ports therefore defer to the Interested Parties with direct responsibility for such operations with regard to matters such as appropriate met ocean conditions, simulation locations, appropriate number of simulations, simulator set up and configuration and run grading.	
	LGP-012	The Ports are, however, able to offer some input on the second PTSB report of a practical nature given (a) their attendance via an observer at the bridge simulation; and (b) their input into the Examination of the Application. The input of the Ports on the second PTSB report falls into four broad categories on which the Ports would raise concerns in respect of the findings:	Noted
	LGP-013	***A - Treatment of comments on the Specification in the set-up and pre-simulation consultation:*** The Ports have a number of comments regarding the treatment of comments on the Specification in the set-up and pre-simulation consultation…. Within the second PTSB report it is stated that "*the Applicant can confirm that the parameters raised by LGPL/POTL with regard to particular areas of concern, including consideration of the future baseline scenarios and future and current large vessels have been simulated to address concerns raised*" (page 13 of Annex I of the second PTSB report). There is, however, no evidence that the matters raised by the Ports in their response to consultation on the Specification dated 30 July 2019 (the Specification Response) (attached as Appendix A) were afforded due consideration by the Applicant and to the contrary, they	The simulation was managed in such a way as to facilitate the testing of large vessels in a range of limit state conditions. The latter days of the simulation were focussed specifically on this particular question and the ports were invited to (and did) attend to observe and oversee. Such vessels were not planned to be tested in the draft simulation run schedule, however at the sole request of the IP, vessels up to and including 400m in length were simulated on day 5, As such the Applicant responded directly and positively to this request and it is of regret that the IP considers this not to be the case.

Consultee	Ref	Comment	Applicant response
		appear to have largely been dismissed out of hand. There is also no evidence that HR Wallingford, as independent manager of the simulations on behalf of the Applicant, was consulted on such matters. This appears to contradict the Applicant's contention that the second PTBS "will address the concerns raised by IPs with regards to potential future use of the inshore route by vessels of a larger scale that currently utilise the routes" (para 3 of Specification). If the second PSTB was intended to robustly address the concerns of IPs then it is reasonable to expect that the views of IPs were given significant weight. This does not appear to the Ports to have been the case.	
	LGP-014	It is noted that paragraph 27 of the Specification indicates that "*Consultation with IPs will seek to achieve a consensus such that by 8th August 2019 the final simulation procedures and run sequencing are agreed. The Applicant will seek to accommodate reasonable requests from IPs and, in the event that agreement cannot be reached, divergence of views will be recorded in the simulation report*". However, following submission of the Specification Response there was no further discussion of the concerns raised therein and such matters remained unresolved. Furthermore, the resulting divergence of views is not represented in the second PTSB report. To the contrary, Annex I of the second PTSB Report is misleading in that it suggests such matters were addressed by the second PTSB, which does not appear to be the case. To give a direct example of where feedback was not properly taken into account, one of the Ports' comments in the Specification Response was that the second PTSB report should be drafted solely by an independent body; this was not the case - see further comments below regarding the conduct of the simulations.	The Applicant can confirm that various sections of the 2019second PTBS report were in fact drafted by the independent operator (HR Wallingford), and that significant collaboration and liaison between parties, inclusive of HR Wallingford, took place in order to submit the results and conclusions in a timely fashion. HR Wallingford also concluded the study was appropriate to meet the agreed objectives of the study, and as such whilst multiple parties contributed to the drafting rather than a single body, the outcomes and conclusions would not materially change.
	LGP-015	***B - Future traffic growth:***	N/A
	LGP-016	With regard to appropriate assumptions for future growth in background shipping levels, section 5.4 of the second PTSB report suggests that the conclusions of the set-up day were that "*background traffic was realistic*". However, the Ports suggest that it is unlikely that any of the parties present, save for the Applicant, would have been in a position to understand likely future growth such as to reach a conclusion on this matter. There is no evidence that either the HR Wallingford representatives or the independent mariners involved in the set up days were advised of matters pertinent to such considerations, such as the significant additional consented and committed (but as yet unimplemented) port development in the Thames Estuary or the advice contained within Table 85 of the Marine Management Organisation's MMO1127 document. Thus, it would appear that the reported set-up day conclusion relates to existing background traffic and any conclusions regarding suitable growth to represent future baseline traffic levels are those of the Applicant without any independent verification. See comments above in section 2 in respect of the CRA which outline the Ports' views and relevant submissions on traffic growth in more detail.	The Applicant has responded elsewhere within this document and supporting documents with regards future traffic baselines. With regards the 2019 PTBS more specifically the Applicant can confirm that predicted 24hr traffic numbers of up to 14 vessels (increased from the approximately 11 vessels per day found from AIS data), were compressed into a single simulation run, lasting around 1 hour. This thereby increased vessel traffic density beyond experienced levels. This is considered an appropriate test of the limit state with regards pilotage operations within areas of increased vessel density.
	LGP-017	Section 6.1 of the second PTSB report refers to the conclusions of the independent simulation run report by HR Wallingford (presented in Annex E) that the density of background shipping to be utilised in the simulations was representative. However, again it is not clear whether such conclusions related to existing shipping levels or those likely to be experienced during the 'Reasonable Planning Horizon'.	

Consultee	Ref	Comment	Applicant response
	LGP-018	***C - Conduct of the simulations:*** In the Specification Response the Ports challenged the proposed roles of HR Wallingford and Marico Marine. In doing so the Ports were seeking to ensure that the second simulations, including the set- up and reporting thereof, was managed and conducted as independently as possible of the parties engaged in the Examination. It was the view of the Ports that the second simulations and subsequent reporting should be managed and conducted by HR Wallingford, in association with independent mariners. The Ports contended that the role of Marico Marine should be as a consultee/observer contributing in a similar and equal capacity as other interested parties. For the avoidance of doubt, the suggestion made by the Ports was in no way intended to question the professional integrity of Marico Marine. The suggestion was, however, made with a view to ensuring the fairest and most balanced circumstances for the simulations and reporting as possible. It was considered that HR Wallingford was therefore best placed to carry out a fully independent simulation.	Strong emphasis was placed, during the set up and the execution of the simulations, on ensuring every individual or organisation who wished, could be present at the 2019 PTBS and could influence proceedings. Attendees and observers had full and free access to every part of the simulation and opinion was sought and encouraged at every opportunity – there was no occasion where an opinion or an idea was discarded or not recorded. Whilst Marico Marine was responsible to deliver the framework for a fair and comprehensive simulation, the simulation was delivered by the independent mariners and by HR Wallingford. Observers and any other participants, including the ports' representative had frequent opportunity and were encouraged to report if they considered any undue influence was being applied. No such concerns were raised during the simulation. The Applicant maintains that the process was fair and appropriate, and this has been accepted and welcomed by both the MCA and TH attendees. The Applicant agreed to the dedication of an entire day of simulation to examine the 400m ship transfer question, as was raised by the port IPs. The simulations also focussed on the use of 400m vessels in 'limit states', i.e. metocean conditions that occur <5% of the year and in many of the simulated circumstances (>25knots) occur <2% of the year according to long term metocean monitoring undertaken by Cefas. As such the simulation can be considered to have been conducted using highly precautionary future baseline scenarios for limit state vessels, and highly precautionary scenarios for metocean limit states. The intention of the 2019 PTBS was to address concerns raised by IPs on the first simulation and, where possible, to engender a collaborative study, whereby attendees were encouraged to engage and could witness the proceedings, such that if genuine differences existed, these could be discussed with a view to reaching common ground. For those observers who attended the simulation, the Applicant found this approach to have worked. Unfortunately, not all IPs were able to provide even an observer, although PLA had confirmed in writing that the Harbour Master and a PLA pilot would be in attendance.
	LGP-019	The arrangements suggested by the Ports were not established and Marico Marine took the lead role in managing and overseeing the simulations and their set up. As observed during the days during which the Ports' representative was present (Day 1 and Day 5), the role of HR Wallingford appeared to be predominantly limited to the technical operation of the simulator equipment. For example:	The Applicant does not agree with this position. The reality of delivering such navigation simulation exercises is that it requires a collegiate and collaborative approach in order to achieve robust results; this was the case for the 2019 PTBS.
	LGP-020	- Development of the specification was led by Marico Marine (albeit it is accepted that HR Wallingford may have provided information regarding typical metocean conditions).	HRW provided guidance to ensure the specification was representative of metocean conditions and vessel types, and general best practice in undertaking navigation simulations of this type. As has been noted elsewhere it is pertinent to note that metocean conditions tested were 'limit states' and as such confidence can be placed in the results.
	LGP-021	There is no evidence that HR Wallingford provided any adjudication of matters of dispute between the parties at the set-up stage (for example appropriate future vessel growth levels).	HRW provided parameters for vessel movements and discussion was held with them to ensure busy 24hour traffic profiles were appropriately condensed into the specific simulation run. HRW's role was not one of adjudication, but one of independent facilitator to ensure the simulations were run professionally and were reflective of existing and future scenarios. HRW's conclusion that the simulation was fit for the purpose of meeting the study objective is therefore relevant and pertinent in addressing the observations made by the ports.
	LGP-022	All pre-run briefings and post run de-briefings were led by a representative of Marico Marine (not HR Wallingford). Thus, it was Marico Marine who determined what contextual information was made available to the independent mariners within pre-run briefings.	All briefings were open floor with the facilitator (Marico) asking all participants (HRW, IPs, mariners) for feedback which was subsequently recorded. All contextual information was developed in consultation with HRW in developing the scenario before then conveying this to participants - in this context Marico led in conveying information that HRW had played a critical part in developing.
	LGP-023	Whilst, technically, emergency scenarios were introduced to the simulation runs by HR Wallingford, they were introduced at the instruction of Marico Marine's representative (Paul Brown). It was Paul Brown who determined the nature and timing of emergency incidents, not HR Wallingford.	As above all scenarios were developed in collaboration with HRW, inclusive of suitable emergency scenarios. The mechanics of the emergency scenarios were in general terms: briefing, participants head to positions, facilitator (Marico) requests HRW to introduce an emergency scenario during simulation run, precise timing introduced by either HRW or Marico in organic response to wider simulation. It is not therefore accurate to state that Marico

Consultee	Ref	Comment	Applicant response
			determined the nature and timing of emergency incidents as it was an open forum between Marico suggesting an emergency be introduced and HR Wallingford operatives exercising discretion as to timing.
	LGP-024	Whilst the Ports' representative did report that genuine attempts were made by the Marico Marine's representative to avoid giving direction to the independent mariners, it was the view of the Ports' representative in attendance that pre-run briefings were not balanced. There was a tendency to highlight certain matters which favoured the Applicant's interests (i.e. promoting circumstances more likely to make the simulations successful) whilst underplaying other matters which may not have been favourable to a successful simulation result. For example, with regard to the use of the North East (NE) Spit for boarding of pilots to larger vessels, it was suggested that the chart depth at the NE Spit (11.6m) would preclude access by larger vessels which, it was suggested, typically have a draft of between 12m and 15m. However it was not clarified that larger vessels are able to board pilots at the NE Spit during higher tides as evidenced by Table 7.6 of the report prepared by HR Wallingford on behalf of the Ports [REP4C-016], which highlights that six vessels with drafts significantly in excess of 11.6m, and up to 14.4m draft, boarded pilots at the NE Spit in the year to November 2018. It was also not clarified that during certain metocean conditions the NE Spit is the only boarding station which is operational. Thus, the view of the independent mariners regarding the scope of runs to be undertaken may have been influenced and unbalanced. Such an approach was clearly not balanced and it would therefore have been preferable for a genuinely independent simulation to have been carried out by HR Wallingford.	On occasion existing baseline conditions, as discussed and agreed during previous consultation with IPs (such as the qualitative searoom workshop) were conveyed to participants in order to justify the use of larger vessels in depths that may at first appearance appear counter intuitive; in practice larger vessels were utilised. The use of NE Spit was explored in a variety of conditions, with emphasis placed on this station during such simulations. The context that this station is the preferred option for existing operators during certain metocean conditions was therefore inherent in the design and discussed with IPs in advance of the simulations. The Applicant would also note that larger draught vessels were used - 11.6m is the limiting depth stated by the PLA and was agreed by IPs including the ports as the realistic limiting draught, as was confirmed in the Ports D3 submission (REP3-070).
	LGP-025	As evidenced within section 5.4 of the second PTSB report, during the set-up day it was agreed to "undertake transfers for 333m ships during the simulation, but only in conditions with less than 25kts of wind and no more than 1 hour either side of high water". However, it is the Ports' understanding that large vessels rely on (and are directed to) the inshore areas (NE Spit) for pilot boarding during more adverse weather conditions due to other pilot boarding areas being offline in such conditions. Table 7.6 of the HR Wallingford Report at Appendix 1 of [REP4C-016] highlights 8 vessels of over 300m (and up to 333m) (an internet search shows that 7 of such vessels had drafts of 11.6m and above (and up to 14.4m)) which used the North East Spit in the year to November 2018. The Ports are informed that the PLA has weather data for 7 of these transfers which confirms that 5 of the 7 pilotage transfers were undertaken in wind conditions in excess of 25kts (and up to gale force 9 (41 – 47kts)). This disputes the conclusion of the set-up that led to the approach reported in the second PTSB (i.e. undertaking transfers for vessels of 333m in conditions with no more than 25kts wind) and evidences that large vessel transfers at the North East Split happen in winds above 25kts. As such, the decision to limit transfers of 333m ships to conditions with less than 25kts of wind and no more than 1 hour either side of high water is a limitation on the accuracy of the assessment.	This was agreed during the setup day, in practice, and in consultation with the IPs during the latter days of the simulation. Notably on Day 4 wind speeds of 40 and 45 knots were simulated with a variation of ships in size and design. The conclusion on 333m vessels following the set up day was as referred to in the IPs response. The reasons for this were set out in Section 5.10 of Annex C (the Set up day report) and included the fact that there are no records of 333m or larger vessels being served at the NE spit inner diamond. However, in common with the general approach to adapt the run schedule according to mariner and IP feedback, runs were subsequently carried out for large vessels at higher wind speeds including run 10 (a 330m vessel in 30 knots), run 14 (a 366m vessel in 30 knots), run NEC5 (a 330m vessel in 45 knots) which resulted in a marginal score, at the repeat of NEC5 which was a pass. In summary there is no limitation on the accuracy of the simulation and what this demonstrates is the Applicant's willingness to test the limits of the area in response to IP feedback. The PTBS does however caution the use of the inner diamond for very large vessels (330m +) and suggests that serving such vessels either at NE spit or at the Tongue would require planning and a specific set of metocean conditions.

Consultee	Ref	Comment	Applicant response
	LGP-026	***D - Reporting of the simulations:*** Section 5.4 of the second PTSB report suggests that following the set-up day, the parties present concluded that the simulations were suitably accurate and representative with regard to vessel handling characteristics and metocean conditions. However, both the feedback reported in Annex D of the second PTSB report and comments witnessed and recorded on Day 1 of the simulations by the POTL/LGPL representative present contradict this somewhat. With regard to Annex D the Ports highlight the following comments of independent mariners: - *"The simulation does not represent the roll of the ship very well when beam onto the sea, I think in a rea situation this boarding and landing may not have been possible"* - *"Vessel seemed underpowered for this type of vessel. Developed larger rate of turns than I would have expected"* - *"Grande class vessel too slow in prevailing conditions"* - *"232m 8m draft – 35 knot beam wind would have been very unlikely to steer in reality and probably would have needed more engine speed to maintain course"* - *"Simulator did not feel like NW wind at 25 knots"* - *"A large contained vessel such as this in ballast with similar wind conditions may be more challenging"* - *"The sea conditions were not accurate for the wind speed – too calm"* - *"Because the pilot boat failed to operate as instructed during the pre-exercise briefing"* - *"Simulated sea conditions not accurate, appeared to be south east wind and swell"* - *"Headwind seemed to hinder forward speed more than would be expected in reality?"* - *"NE 25 knots would slow the progress of the pilot boat. Pilot boat still able to make way at full speed. Serving two ships at tongue boarding area in these conditions would take longer than simulated due to bad weather"* Such comments appear to contradict the conclusions of the second PTSB report that the parties considered the simulations to be suitably accurate and representative and the second PTSB report is therefore somewhat skewed in the way it presents such conclusions.	The Applicant has presented a true and accurate representation of all comments received by mariners. These comments relate to vessel handling characteristics which were addressed wherever possible. All mariner participants also noted that the observations, whilst helpful, did not materially alter the sense of realism and did not affect the conclusion of the mariners that the simulation was appropriate, and accurate for the purposes of the exercise. The IP will have similarly noted the other overwhelmingly positive feedback from participants, which confirm the accuracy of the simulation and the safety of the operations.
	LGP-027	The Ports highlight that during simulation Run 4 a comment was raised that, despite the fact that background traffic levels had been amended from medium to high growth, there was no noticeable difference in background vessel traffic. Additionally, one of the independent mariners highlighted that for Runs 1 to 3 all vessels (including background traffic) had the same starting position. This comment was not challenged at the time however it was not documented in the second PTSB report which further goes to show that it does not always represent the views of those involved with the simulations in a balanced and impartial manner.	The purpose of consultation on the 2019 PTBS was in order to ensure that views expressed were accurately reflected. Whilst it is unfortunate that this particular comment was not raised during previous consultations and responded to within the report, the observations whilst valuable do not change the outcomes of the simulation.

Consultee	Ref	Comment	Applicant response
	LGP-028	As explicitly clarified to the Applicant and those present during introductions at Day 1 and Day 5 of the second simulations, the representative of the Ports in attendance did not have a maritime background or technical expertise with regard to maritime matters. As such, the purpose of the representative's attendance was strictly to observe the simulations and report observations. Thus, whilst as reported in section 3.3 of the second PTSB report, the Ports' representative "was given the opportunity to comment on the accuracy and conduct of the simulations", any such comments would have necessarily been limited to non-technical matters. There are a number of areas within the second PTSB report that appear to suggest a wider involvement of the Ports' representative or in some cases endorsement of matters by parties present (and by implication the Ports' representative). The Ports consider such suggestions misleading and for the avoidance of doubt the Ports' representative attended in an observational capacity only and did not endorse the approach at any stage. For example, with regard to section 5.7 of the second PTSB report, the Ports' representative did not review the methodology as is suggested. Additionally, contrary to a number of references in Annex ,I the Ports' representative did not comment on the degree to which: - "transfers on or in the vicinity of the Elbow were adequately explored" (Page I5 of Annex I); - "real world conditions were simulated as closely as possible" (Page I5 of Annex I);- "emergency scenarios represented a realistic set of circumstances" (Page I6 of Annex I); - "the simulation represented a realistic simulation of the metocean conditions" (Page I7 of Annex I); or- "the emergency scenarios were a realistic representation" (Page I11, of Annex I).	The Applicant recognises that the lack of commentary should not always infer agreement. It is however relevant to record that the IP was provided with the opportunity to express views on the conduct of the simulations. Notwithstanding this clarification the Applicant recognises that the IP was primarily in attendance in an observer capacity and would iterate that the primary intention of the text in question was to clearly and transparently convey MCA and TH's agreement on these matters.
	LGP-029	For clarification, the lack of comments by the Ports' representative should not be interpreted as agreement with such matters, as is suggested within Annex I. With regard to such matters the Ports defer to the Interest Parties with direct responsibility for pilotage and navigational operations. As set out above, the Ports are disappointed that the simulations were undertaken at a time when such Interested Parties were unable to participate.	The Applicant recognises that the lack of commentary should not always infer agreement. It is however relevant to record that the IP was provided the opportunity to respond, in much the same way as the MCA were provided with the opportunity to respond, which they did by recognising the value of independent participants. The Applicant sought to facilitate attendance of all IPs but the absence of one or more parties does not alter the conclusions drawn by the independent study.
	LGP-030	Section 6.1 of the second PTSB report suggests that "all 41 of the simulation runs were graded by the independent participants to be an overall success, with no concerns raised". Based on the observations of the Ports' representative present on Day 1 and Day 5 of the simulations, the Ports consider that this representation of the results is misleading. The Ports note the feedback of the independent mariners set out in Annex D of the report, which includes the following comments showing that concerns were raised: - "The simulation does not represent the roll of the ship very well when beam onto the sea, I think in a real situation this boarding and landing may not have been possible"- "lee for disembarkment not as good, could be dangerous"- "required to close to less than one mile from the wind farm due to outbound traffic"- "coming down from the north east the passage plan had me passing over 2 swpt wrecks of less than my draft"- "(simulation accurate) but not a situation (risk v searoom) which I would be comfortable as a 'routine'".	The comments made by the independent mariners on feedback sheets were published in full in order to ensure that there was no suspicion of undue influence or misrepresentation of results. Nevertheless, it should also be recorded that the overwhelming tone and content of feedback was positive as recorded in the final report. The ports' representative will also recall the brief where each one of the participants was expressly and continually instructed to "act as he would do in real life" as well as recalling the comprehensive debriefs for each of the runs where each comment, good and bad was discussed, addressed and analysed. The results were therefore valid and the feedback would not materially alter the findings of the simulation which concluded >98% individual pilot transfers completed in challenging conditions, with a single marginal pass which was subsequently completed without incident.
	LGP-031	The Ports also note the conclusion offered on Page 14 of Annex I of the second PTSB report that "Margate Roads located 3nm to the west of the NE Spit pilot diamond and 5NM to the west of TEOW was not ignored during the 2019 PTBS, it just did not play a significant part as it was geographically too far away". However the Ports note the feedback of one independent mariner on Day 3 of the simulations (as reported in Annex D) which stated: "*I would not have been as comfortable if a vessel was anchored in the deepwater anchorag*e".	The deepwater anchorage is north of NE spit cardinal buoy therefore not relevant to Margate Roads.

Consultee	Ref	Comment	Applicant response
	LGP-032	The Ports' representative was present during the introductory briefing to the Day 1 simulations during which appropriate pilot transfer times were discussed. As reported in section 5.4 of the second PTSB report, these were originally proposed by the Applicant as 1 minute for pilot embarkation and 3 minutes for disembarkation. However, contrary to section 5.4 of the second PTSB report, the independent mariners present subsequently proposed and agreed an amendment to 90 seconds for embarkation and disembarkation combined. The Ports' representative subsequently witnessed the period of 90 seconds being utilised for disembarkation within the Day 1 simulations. Thus the reference to 3 minutes for disembarkation within the second Simulation report is not correct for all (if any) runs.	The minor changes to timings for embarkation and disembarkation on day 1 of the simulation was recommended and agreed by all present, after feedback from attending independent mariners who are active unrestricted pilots and coxswains. The ports' representative was present for this discussion and offered the opportunity to disagree or register disquiet on this collaborative decision. No reservations were tabled, while it is recognised the individual is not a master mariner, professional advice could have been sought or a reservation could have been tabled to the Applicant, Marico Marine, or any of the professional independent mariners and pilots to explain their recommendation further. Similarly, all of the transfers throughout the simulation took place in locations, where if an additional 3 or 5 minutes had been imposed for embarkation or disembarkation it would not have materially affected the result of the simulations. Professional pilots and coxswains would not allow a pilot transfer with vessels of this size / value / manoeuvrability to be undertaken, where the error margin or proximity of danger was such that an additional 3 or even 5 minutes of transfer time would stand a vessel into danger.
	LGP-033	**Conclusions on the Bridge Simulation Report** While the Ports defer to those organisations responsible for pilotage and navigational operations with regard to technical matters, there are a number of points on which the Ports would contest the findings of the second PTSB Report, as follows: ***(a) Treatment of comments on the Specification:*** the comments of the Ports on the Specification were not properly taken into account, were not subject to independent consideration and were not afforded due consideration by the Applicant in conducting the simulation.	The Applicant can confirm that all received comments were given fair consideration and many amendments to the specifications were made either in advance of or during the exercise.
	LGP-034	***(b) Future traffic growth***: it is not clear what level of background future vessel traffic growth was adopted for the simulations and the Ports remain concerned that the background traffic levels utilised significantly understated likely growth in vessel traffic during the 'Reasonable Planning Horizon'.	The Applicant confirms that future traffic growth has been addressed both in this submission and in submissions during examination. It is of regret that the IP appears to have not provided a response to the latter, which comprised a detailed analysis of DfT data.
	LGP-035	***(c) Conduct of the simulations:*** the Ports were disappointed that the Applicant did not take the opportunity to commission HR Wallingford to lead the simulations independently from the views of the various parties to the Examination. It was also disappointing that the simulations were not scheduled such as to allow the participation of Interested Parties responsible for pilotage and navigational operations in the vicinity of the TEOWF. As a result, the Ports are concerned that the runs simulated were not representative of all likely scenarios, particularly with regard to large ships boarding pilots at the NE Spit during adverse weather conditions.	The Applicant can confirm that significant collegiate and collaborative work between HR Wallingford and Marico Marine was undertaken in order to ensure a transparent study and delivery of conclusions. The absence of other local IPs, whilst regrettable, does not materially alter the findings of the 2019 PTBS. It is also of note that the results of the 2017 PTBS which was undertaken with local IPs in a simulation facility operated by local IPs for training purposes produced the same results.
	LGP-036	***(d) Reporting of the simulations:*** finally, the Ports have concerns that the reporting of the simulations, as set out in the second PTSB report, is not entirely representative of the simulations undertaken and that the conclusions drawn out within the report are not therefore suitably robust.	The Applicant has presented verbatim comments from mariners, demonstrating the transparency with which the simulation was carried out. As with any such exercise, there will be comments received on what could be improved or amended, however the question is whether these would have had a material effect on the result. Evidently from other comments which the IP has not considered, every run was safely undertaken and 99% were considered sufficiently realistic for the task.
	LGP-037	In view of the above, the Ports' concerns regarding the impact of the TEOWF on shipping and navigation interests are sustained and the findings of the second PTSB report do not allay the concerns in this respect raised during the Examination of the Application.	The IP repeatedly and consistently requested further simulation of the area. This has been undertaken and no relevant arguments have been presented as to why the results of the 2019 PTBS should be dismissed

Table 2 Non shipping responses

KWT	KWT -001	**Nature Reserve Wildlife:** KWT would not support the substation being built on the Bay Point Club due to the proximity of this site to the KWT Stonelees Nature Reserve. The Stonelees Nature Reserve is located directly north of the Bay Point Club and therefore KWT would have concerns about the impacts of substation construction and maintenance operations on the wildlife of the area, particularly during the construction phase due to increased noise levels and activity over the predicted 24 month construction period. We believe that the potential for environmental disturbance is likely to be higher if the substation is constructed at the Bay Point Club compared to the proposed substation site location.	The Applicant welcomes KWT's response and can confirm that the conclusions match those of the Applicant's with regards development at the Bay Point Club not being preferred given its environmental sensitivities when compared to the proposed substation site.
	KWT -002	**Seal colony mitigation:** We would also like to voice our concerns regarding the BCA Fleet Solutions 'substation site' which has also been suggested (paragraph 8). Although situated at a further distance from the Stonelees Nature Reserve, it is likely that the BCA Fleet Solution substation site has the potential to cause more disturbance to seals when compared to the originally proposed substation site. The River Stour is an important foraging and breeding area for seals and all of the three proposed substation sites are located close to the Pegwell Bay seal colony. Therefore it is important that for whichever substation site is selected, if consent for the project is given, the impacts to the seals and seal colony area are minimised and commitments made to ensure work is carried out in this area at times when the seals are least sensitive to disturbances (e.g. during non-breeding season). The seals are thought to use most of the River Stour and can travel relatively far inland along the river, however, they are most commonly observed at the mouth of the river and the more northerly reaches of the river. Therefore as the proposed substation site is located furthest south of the three presented possible options, we believe that there would be fewer direct and indirect impacts to the seal colony and to the Stonelees Nature Reserve if this site is selected. With this in mind, KWT believe that the proposed substation site (currently owned by Ramac Holdings (Trading) Limited ("Ramac")) would be the least damaging and disturbing option in terms of environmental impacts.	The Applicant welcomes KWT's response and confirms that seal haul outs formed a component of site selection and design (which combined with saltmarsh impacts resulted in removal of one of the earlier options), and as such the conclusion made by KWT is in line with the conclusion drawn by the Applicant.
	KWT -003	These comments are made without prejudice to KWT long-standing objection to the offshore cables for the Thanet Extension making landfall at Pegwell Bay due to the environmental designations at this landfall site. (Full details of the Kent Wildlife Trust objection to this landfall site can be found in the Kent Wildlife Trust Response to the Preliminary Environmental Information Report (PEIR) (Jan 2018); Relevant Representation (Sept 2018); Written Representation (Jan 2019); verbal and written cases made at the Environmental Issue Specific Hearing (Feb 2019); and Statement of Common Ground (May 2019) submitted as part of the planning and consultation process).	The Applicant recognises KWT's position and has nothing further to add.
SCC	SCC-001	The location of the application site is remote from Surrey and therefore we have no observations to make on the application.	The Applicant recognises Surrey County Council's position and has nothing further to add.
TCE	TCE-001	**Agreement for lease:** In response to the question raised in section 4 of Mr Leigh's letter headed, Agreement for Lease, I can confirm that The Crown Estate has executed agreements for lease with the Applicant in relation to the Thanet Extension offshore wind farm array area and the related	n/a

		transmission assets. The Thanet Extension wind farm lease provides for a maximum generating installed capacity of 300 megawatts, or such greater capacity as may be agreed in writing between the parties.	
RHL	RHL-001	**Compulsory Aquisition:** In short, we confirm that Ramac Holdings (Trading) Limited has not concluded a commercial agreement with the Applicant on the powers sought by the Applicant in relation to Ramac Holdings (Trading) Limited's land. Accordingly, Ramac Holdings (Trading) Limited does not withdraw its objections.	
	RHL-002	Without wishing to trouble the Secretary of State by repeating matters already addressed by way of submissions within the DCO process, we should like to highlight at this stage the following matters: 1. Ramac Holdings (Trading) Limited first raised objections in respon se to pre-application consultation almost two years ago, in January 2018. 2. The first all parties settlement meeting took place at Vattenfall's London offices on 9 January 2019. 3. Ramac Holdings (Trading) Limited then attended both Compulsory Acquisition Hearings on 21 February and 18 April 2019, on both occasions raising concerns about the selection of its land for the onshore substation, the proposed siting of the substation within its landholding and the extent land take proposed. 4. Detailed written submissions were subsequently made by Ramac Holdings (Trading) Limited dated 28 May 2019, upon which our client relies. 5. A joint statement submitted at Deadline 6 by both Ramac Holdings (Trading) Limited and the Applicant records continued negotiations between the parties, with both parties being hopeful an agreement could be reached. It is also noted that in the same response it is stated "the parties have agreed to work towards a target date of conclusion for the transaction of 11 June 2019". It is the position of Ramac Holdings (Trading) Limited that it and its advisers have used all reasonable endeavours to secure concluded agreements and it is most disappointing that, despite there having been ample time to do so, no commercial agreement has been concluded. The Examining Authority rightly made clear at the preliminary meeting in December 2018 that regard would only be had to any concluded agreements.	The Applicant submitted a contact log to the Secretary of State, demonstrating the extent to which the Applicant has sought to engage with Ramac in order to negotiate terms for a commercial agreement. The Applicant is equally disappointed that this has not yet been concluded, however progress continues to be made.
	RHL-003	We would submit that the very fact that the Secretary of State requires further details and additional evidence from the Applicant at this late stage is most telling. It is our client's position that the Applicant has had more than ample opportunity to put forward detail and evidence to support its case, but has failed to adequately do so throughout the whole DCO process. It is our client's case inter alia that the assessment of alternative sites and justification asserted for the land take on the application documents were entirely unsatisfactory, evidenced by the fact the Applicant's initial position was that "land ownerships are still under consultation with all relevant parties and will be taken forward in the Post -Consent phase" . We submit further the detail/evidence submitted by the Applicant via the DCO process was also lacking.	The Applicant responded to this matter in Annex B of its letter to the Secretary of State on 13 December 2019.

	RHL-004	It accordingly remains our client's position that the Applicant has failed to demonstrate a compelling case in the public interest to support the compulsory acquisition in respect of our client's land, and Ramac Holdings (Trading) Limited maintains that the Applicant should be refused the powers of compulsory acquisition it seeks in all the circumstances.	The Applicant's compelling case is set out in the Statement of Reasons (REP7-027) and this was expanded further in response to the Secretary of State's letter of 21 November 2019.
	RHL-005	If the Secretary of State is to receive/accept any further detail or evidence from the Applicant, our client requests a reasonable opportunity to consider the same and prepare submissions/evidence in response. Given the forthcoming Christmas holiday period, we would ask that any deadline should be no earlier than 24 January 2020. We will be making submissions on costs in due course.	n/a
EA	EA-001	Saltmarsh Mitigation: We have no objection to the proposed additional text suggested by the Secretary of State.	The Applicant notes, as with the response to Natural England's observation, whilst there is no in principle objection to the additional text there is a risk of complication within the wording because the ringed plover condition already exists. As such the Applicant has provided suggested wording that seeks to avoid the complication.
	EA-002	We agree with our colleagues in Natural England, letter dated 5 December 2019 that the requirement should state that the plans need to be submitted at least 4 months prior to the proposed works within the saltmarsh. This will allow interested parties time to review them.	Requirements are determined in accordance with Schedule 10 of the draft DCO. For dML conditions it is agreed that plans, including the SMRMP, should be submitted 4 months prior to the proposed works.

Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex C - The Applicant's summary position on shipping and navigation

Drafted By:	Vattenfall Wind Power Ltd
Approved By:	Daniel Bates
Date of Approval:	31st January 2020
Revision:	A

Revision A
N/A
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N/A

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1 The Applicant's submission on shipping and navigation

1.1 The Applicant's position at the end of examination

1 The Applicant submitted its final position on shipping and navigation at Deadline 8 (REP8-003), setting out the clear case for concluding that there will not be unacceptable risks to navigational safety.

2 In addressing representations from third parties during the examination, the Applicant has provided significant additional evidence from maritime experts, all of which supports and endorses the conclusions of the Navigation Risk Assessment (NRA, APP-089) and NRA Addendum (NRAA, REP5-039), that there will be no unacceptable risks to navigational safety given the mitigation secured.

3 In particular, the Applicant has submitted further assessment, undertaken additional consultation and secured mitigation through a significant amendment to the project in order to provide further confidence on levels of risk and address Interested Parties' (IPs) concerns. In addition to the NRA and supporting studies submitted with the application, the Applicant has provided:

- Additional AIS data and assessment to enable a conclusion that the baseline data used in the NRA is representative and can be fully relied upon;
- Technical workshop, engaging IPs in discussion on the qualitative and quantitative parameters to apply to searoom calculations when considering the introduction of an SEZ;
- Hazard risk assessment workshop, engaging all IPs in discussion on baseline and inherent risk scores;
- A material amendment to the project boundary, through inclusion of a Structure Exclusion Zone (SEZ), which was made in addition to a reduction in the Order limits prior to submission of the application in response to Section 42 consultation;
- Further risk controls, for example provision of site specific metocean data;
- Independent Collision Risk Modelling to assess the increase in collision risk following the introduction of the SEZ
- Provision for compensation associated with the proposed need to relocate the Tongue pilot boarding diamond, which is secured by Requirement 30 of the dDCO.

4 This evidence, and how it responded directly to IP concerns, is set out in Table 1.

5 In summary, the Applicant has sought to fully engage with IPs to ensure that the mitigation solution proposed will enable the project to successfully co-exist with navigation uses of the sea. No evidence-based objection which properly engages with the material before the Secretary of State has been submitted to substantiate any of the concerns raised by IPs. In contrast, the further work undertaken by the Applicant confirms and supports the accuracy of the conclusions contained in the Applicant's detailed assessments, which were fully considered during the examination.

1.2 2019 Pilot Transfer Bridge Simulation (PTBS)

6 At the close of the examination the only aspect of the original NRA which had not been subject to further assessment or additional submitted evidence was the pilot transfer bridge simulation (PTBS). Whilst the Applicant considers the 2017 PTBS to be a robust and reliable study, a further PTBS was considered by Port of London Authority (PLA)/ Estuary Services Limited (ESL) and Port of Tilbury (PoT) / London Gateway (LG) to be required to reach a conclusion on the impact of the project on navigational safety, particularly for pilotage. At Deadline 6A (REP6A-010), in response to the Examining Authority's questions on the need for further simulation, the PLA and ESL stated that:

'In the PLA and ESL's view, a further, more detailed simulation study is necessary to provide an understanding of the impacts of the proposed TEOWF on pilot boarding and landing and the impacts on navigation'

whilst PoT and LG (REP6A-011) stated that:

'the Ports consider that a key missing element of assessment in this Application is a further pilotage simulation study, one that is representative of the size and mix of vessels likely to transit the inshore channel/board pilots at the NE Spit in the future baseline scenario. This is required in order to inform sea room requirements and the likelihood of incidents. Without such a study, it is simply not possible to assess adequately the impacts on navigational safety and the resulting economic impacts on commercial vessels.

The Ports consider that such a further pilotage simulation study in particular would certainly be of great value to the Secretary of State in evaluating the overall impact of the proposed development.'

7 Additionally, Trinity House had also noted (REP5-074) that they considered the 2017 PTBS to have reliance on local knowledge and expertise, which could be addressed through inclusion of greater independence in any subsequent PTBS undertaken. The participation and qualitative feedback from independent mariners was a significant factor in the 2019 PTBS.

8 Following examination, the Applicant consulted further on the specification for a second PTBS, undertook the PTBS using independent mariners, and submitted the findings of the PTBS for further consultation, before submitting the 2019 PTBS report to the Secretary of State. As per the comments above, IPs have placed great weight on the need for, and results of, a further pilotage simulation. The conclusion of the 2019 PTBS unequivocally supports the Applicant's position, demonstrating through 159 simulated pilot transfers that safe operation could continue in all areas of the NE Spit pilot boarding area. The Applicant's response to comments on the 2019 PTBS report are set out in Annex A and Annex B to this submission to the Secretary of State.

1.3 Navigation Risk Assessment (NRA)

9 The Applicant submitted an MGN543 compliant NRA as part of its application (see the MGN checklist, REP2-030). The MCA agreed that it had been undertaken in line with their guidance, whilst noting concerns raised by IPs during examination regarding the qualitative aspects of the NRA, and therefore its conclusions.

10 Each relevant part of the NRA has been the subject of full and rigorous examination and has resulted in the submission of additional assessment far in excess of that provided for any previous offshore wind application (as set out in Table 1). As a result, the Secretary of State can be confident that the conclusions of the NRA and NRAA are sound and can be fully relied upon.

11 The IPs submissions have not demonstrated that the conclusions of the NRA and NRAA are unsound, despite significant opportunity to do so, including during or following the hazard workshop.

Structures Exclusion Zone

12 Following the material change to the project made at Deadline 4 (the Structures Exclusion Zone (SEZ)), the Applicant reviewed the NRA, producing an NRA Addendum which robustly assesses risks associated with the inshore route between the wind farm and the Kent coast (concerns about which the introduction of the SEZ directly addressed).

13 As a result of the introduction of the SEZ, the MCA, TH and CoS all concluded in their respective Statements of Common Ground that there is sufficient sea room for transiting vessels (notably one of the key commercial concerns raised by PoT / LG).

14 As set out above, the SEZ is in addition to a previous significant project boundary change made following Section 42 consultation as well as commitments to further risk controls, all of which seek to provide comfort to the IPs and the Secretary of State that the conclusions of the NRA (and NRAA) are highly precautionary, and the relevant tests of NPS EN-3 have been met. The Applicant's compliance with those policy tests are set out in REP8-009 and are summarised in Section 1.5.

15 The inputs and assessment of the NRA and NRAA have since been supplemented by the 2019 PTBS which supports the conclusion reached, that the project risks are comfortably within ALARP and are tolerable, is a robust, precautionary and consistent position that can be confidently relied upon.

Tolerability of risk

16 The guidance on methodology for Navigation Risk Assessment of offshore renewables[1] sets out the tests by which tolerability of risk should be considered and states: *Determining whether the predicted level of risk from an OREI development is tolerable or not is in the first instance a matter of asking the following questions: i) is the risk below any unacceptable limit that has been established? ii) if so, has it also been reduced to as low as reasonably practicable (ALARP)?.*

17 In response to i), the Applicant agreed with the MCA in the SoCG that it was appropriate to use HSE standards to establish whether the risk was below their established unacceptable limits. The NRA sets out in Section 8.6.3 (APP-089) that the risks are all below the relevant limits and, given the introduction of the SEZ, these results should be considered highly precautionary.

18 In addition, all hazards in the NRAA and NRA were assessed as below 'intolerable', with scores falling into 'ALARP' or 'low' categories.

19 There has been no clear or convincing evidence put forward by IPs to justify why the NRA or NRAA hazard scores which fall into the ALARP category should be increased so significantly as to fall within 'intolerable'. The hazard scores discussed and agreed in the hazard risk assessment workshop confirmed inherent risks were ALARP, even with the highly precautionary approach taken by IPs. Furthermore, the PLA and ESL submitted their own 'rescoring' of the NRAA hazards which also concluded that inherent risks (i.e. those before additional risk controls are considered) were in the ALARP category (REP4C-015).

[1] Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI), 2013 (DfT / MCA).

20 The general position of IPs has been that further reductions in the project boundary beyond the SEZ are required, and this is reflected in the MCA's Deadline 5 submission (REP5-063). However, IPs have not provided evidence-based grounds for assertions that the sea room is inadequate or unsafe. As the Applicant set out in REP8-003, the distance of 2nm + 1nm buffer for pilotage is not a robust, evidenced requirement that is a de facto limit on safe operations. Whilst there is in excess of this sea room in the most densely worked area for pilot transfers, as demonstrated by the 2019 PTBS (and seen in other pilotage districts) pilotage can be undertaken safely in areas of less sea room.

21 Pertinently, a boundary change is an embedded risk control which seeks to reduce the projects' inherent risk, however, the conclusion in the NRA and NRAA that the project is ALARP confirms that the boundary as it stands is acceptable subject to consideration of further risk controls.

22 The only remaining matter therefore is whether there are any further risk controls that can be introduced.

Further risk controls

23 As set out in the MCA's guidance on NRA for offshore renewables[1] *'Establishing what is reasonably practicable [in terms of ALARP] involves considering whether further risk control measures are called for. This must be considered in terms of:*

- *whether the cost of further measures would be grossly disproportionate to the value of the benefit obtained; and*
- *whether relevant good practice has been followed.'*

24 The MCA confirm in their Deadline 6 submission (REP6-087) that the further risk controls considered by the Applicant, but not taken forward, in the NRA and NRAA were 'disproportionate' and therefore not necessary in the context of ALARP.

25 Trinity House suggested AIS monitoring pre and post construction to allow for ongoing review of the efficiency of aids to navigation; this was committed to by the Applicant and welcomed by the IP (REP5A-006)

26 Following review of the PLA's own 2015 risk assessment and risk controls not adopted (REP5-070), the Applicant committed to providing site specific metocean data to PLA / ESL to aid in planning and risk management of their operation.

27 Relevant good practice including use of guard vessels, appropriate lighting and marking, provision of agreed aids to navigation and providing notices to mariners has been committed to by the Applicant (REP7-033). The Applicant also amended the SEZ definition in the dDCO to exclude blade oversail, in direct response to IP feedback.

28 No further risk controls or relevant good practice were identified or requested by any IP, and therefore the Secretary of State can be assured that no further reasonable measures are necessary, and that risks have been reduced to ALARP in accordance with EN-3.

1.4 Engagement with IPs

29 The MCA confirms in their Statement of Common Ground that the Applicant has submitted an NRA which is compliant with their own guidance (MGN543). In addition, the MGN543 checklist (REP2-030), agreed with the MCA, confirms that all relevant parts of the NRA have been adequately undertaken; under 'appropriate risk assessment' the note reads '*This NRA has been conducted in compliance with the guidance and is proportional to the level of risk at the site. Due to concerns raised by stakeholders, a significant body of additional work has been conducted (navigation simulation and modelling) to build confidence in the assessed level of risk*.'. Notwithstanding this, the MCA has not been able to agree the conclusions of the NRA given that there are outstanding objections from pilotage operators, principally the PLA and ESL, to whom the MCA has deferred pilotage considerations.

30 In accordance with EN-3, the Applicant has made extensive efforts to address the concerns of IPs, including the PLA/ESL in order to allow the project to co-exist with their commercial operations. Significant mitigation in the form of the SEZ has been proposed, supported by extensive evidence submitted as part of the original application and through the examination which demonstrates that the project and other stakeholders can successfully co-exist. No alternative solution for co-existence, or further 'reasonably practicable' risk controls (in terms of ALARP) have been proposed by IPs.

31 In responding to the Secretary of State's letter, the MCA has concluded (in respect of the 2019 PTBS) that '*the simulation report is not an alternative to the NRA and just addresses one aspect of what is being validated – the pilot transfer operation, although professionally undertaken.'*. The 2019 PTBS was never intended to replace the NRA and was only submitted to respond to the PLA and ESL's outstanding concerns of assessing impacts on pilotage operations following the introduction of the SEZ. In this respect, the 2019 PTBS does indeed provide a validation of the NRA inputs, as well as confidence in its conclusions. Notwithstanding its statutory role, the MCA has not sought to conduct detailed review of the technical work submitted by the Applicant or therefore provided any substantiated justification that the Applicant's evidence cannot be relied upon.

32 Despite the experience and local knowledge of IPs in relation to the operational Thanet Offshore Wind Farm, no evidence of existing navigational risk, in the form of incident logs, risk assessments, evidence of issues raised to industry forums or records of pilot transfers have been provided by IPs to inform the NRA or the examination of the project. Reference to the PLA NE Spit NRA (2015) confirms that the IP considers the baseline risk associated with the existing OWF to be so low that no additional controls are proposed. Whilst the Applicant submitted ESL incident log data (REP4B-006) it was limited in detail and did not identify any significant baseline risks or any specific change in operation since the construction of Thanet Offshore Wind Farm.

33 Whilst IPs raised concerns in relation to the qualitative elements of the NRA, this is only one part of the overall navigation risk assessment process, and one that is woven into the consideration of quantitative tools rather than being the ultimate arbiter of navigational risk. This is reflected in MGN543 where higher tier evidence, such as collision risk modelling and bridge simulation, are considered for more complex projects when qualitative input alone is insufficient. In fact, bridge simulation requires an extensive amount of qualitative input both through participation and review of success criteria which support the quantitative outputs. The hazard workshop also inherently utilises a combination of qualitative judgement and quantitative data, using regional statistics to benchmark the likelihood of an incident, but applying qualitative judgement to increase or decrease the likelihood according to participant perception. The results of these more quantitative risk assessment tools should be given significant weight, with professional judgements from both the Applicant and IPs considered in combination.

34 It is also necessary to distinguish commercial impacts and the potential impact on navigational safety. Where there is an existing commercial interest, as is the case with the PLA, ESL, and the ports, it is necessary to establish where concerns relate to safety, and where they relate to commercial impacts. The Applicant's evidence illustrates that pilotage and vessel transits can be undertaken safely with the project in place. In respect of the operational aspects of pilotage, the only demonstrable physical effect has been addressed by the Applicant through Requirement 30 of the dDCO which recognises the potential displacement of the Tongue pilot diamond. Further, the 2019 PTBS and analysis of the current use of the area for pilotage demonstrates that, to the extent there would be operational impacts on pilotage, these have been reduced as far as reasonably possible and would be limited to very low numbers of pilot transfers given the simulation of 159 safe transfers covering an extensive range of spatial extent, vessel types and metocean conditions. This is support by analysis of the current use of the area for pilotage and the minimal overlap with the SEZ (REP4-030) and the Applicant's analysis submitted in REP6-020 which, using the limited and precautionary information available, identified 0.5% of vessels that may suffer additional delay as a result of the project, which is well within the year to year variation of service restrictions due to metocean conditions.

35 The Applicant has, throughout the development of the project and during examination, sought to address concerns raised by IPs through the provision of further evidence and assessment, commitment to further risk controls and significant project amendments. Where, despite extensive engagement and mitigation, agreement is not able to be reached, conclusions on navigational safety should not be confused with impacts on commercial operations. In this case, and in accordance with the requirements of NPS EN-3 paragraph 2.6.156, navigation safety has been determined through a robust NRA produced in line with relevant Government guidance, undertaken by experienced professionals with significant maritime experience in line with qualitative input from both IPs and the Applicant, two CRMs and two bridge simulations.

1.5 Compliance with the National Policy Statements

36 The Applicant set out its position on relevant planning policy in detail at Deadline 8 (REP8-009). This submission brought together discussions that occurred throughout the examination, concluding:

- The Applicant's assessment including an NRA undertaken in accordance with relevant Government guidance complies with sections 2.6.153 – 160.
- Paragraph 2.6.161 does not apply to the project as it does not affect a recognised sea lane. This has been confirmed by IPs in response to the Examining Authority.

- It is not certain that paragraph 2.6.162 applies to the project, however to the extent it does, the project complies with all aspects of this policy:
  - Site selection, reflected in the concessions to the project boundary, has been made with regard to approaches to ports and to strategic routes
  - As confirmed by the agreement of MCA, TH and CoS regarding transiting vessels, the project would not affect major commercial navigation routes and would not cause longer transit times.
- The project has minimised impacts on routes between ports and whilst some existing vessels tracks would be deflected as a result of the wind farm, this would be minimal and the pragmatic approach set out in Paragraph 2.6.163 should apply, given the substantial benefits of the project.
- In accordance with paragraph 2.6.165 and as assessed by the NRA and NRAA, and supported by the additional evidence described in this document including the 2019 PTBS, the project would not pose an unacceptable risk to navigation safety.
- The effects on recreational craft are minimised as agreed with the RYA in their Statement of Common Ground (REP3-044).

1.6 Conclusion

37 In its final position set out at Deadline 8 (REP8-003), the Applicant stated that, based on the evidence provided to date including the 2017 PTBS, collision risk modelling and outputs from the NRAA, the conclusion that should be reached was that *'Pilot transfers would continue to be able to be undertaken in the same manner and in largely the same area as at present.'* and that *'…the proposed TEOW will not present unacceptable risks to navigation…'.* Both of these positions are strengthened by the conclusions of the 2019 PTBS.

38 The results of 2019 PTBS confirm to the Secretary of State that there is sufficient sea room to safely carry out pilot transfers with no operational constraints identified. No evidence in response to the 2019 PTBS has been presented by IPs to identify or quantify the circumstances in which pilotage operations would change when compared to present day operations. In any event, the 2019 PTBS clearly demonstrates that, to the limited extent that such circumstances exist, the proposed mitigation solution put forward by the Applicant's SEZ ensures an appropriate balance between the need for offshore wind and the need for continued access and growth for shipping and ports. Furthermore, the conclusions reached by the 2019 PTBS using independent expert mariners are the same as the conclusions reached by the 2017 PTBS conducted with mariners with local expertise.

39 The 2019 PTBS is one part of a suite of evidence (set out in Section 1.1 and Table 1) which is unprecedented in its scope and depth of analysis for an offshore wind farm. The Applicant has provided a wide range of evidence, produced by respected, certified and experienced practitioners, which takes into account qualitative mariner input alongside quantitative assessment methods. The evidence all lends support to the conclusions of the NRA and NRAA that the risks to navigational safety and pilotage safety from the project are ALARP and tolerable. Significant material changes have been made to the project to reduce the impact on marine traffic and the project is compliant with the policy tests under NPS EN-3. In the absence of cogent and evidence-based objection to the submissions before the Secretary of State, the overwhelming conclusion is that the project will not lead to unacceptable risks to navigation. In determining the application, the Secretary of State should afford significant weight to the conclusions of the NRA, the NRAA and the volume of supporting evidence submitted by the Applicant.

40 As stated in NPS EN-3 paragraph 2.6.153 '*engagement should be taken to ensure that solutions are sought that allow offshore wind farms and navigation uses of the sea to successfully co-exist*'. Solutions have been proposed by the Applicant, and following two major project changes and detailed consideration and response to the issues raised by IPs, the proposal that is presented to the Secretary of State allows the offshore wind farm and navigation uses of the sea to successfully and safely co-exist. This co-existence must also be seen in the context of the substantial benefits of the project, both in terms of the generation of renewable electricity, and the investment in the local and national low-carbon economy.

41 As more offshore wind is developed in UK waters, consideration of the relationship between marine renewables and sea users will inevitably increase. Successful co-existence between offshore wind and marine interests will be essential to meet the Government's ambitious targets for offshore wind (as set out in the Offshore Wind Sector Deal) and the legally binding commitment to reach net zero greenhouse gas emissions by 2050. The evidence submitted for Thanet Extension demonstrates that offshore wind can successfully and safely co-exist with other marine interests.

Table 1: The Applicant's response to IP concerns raised during examination

Topic	Applicant's submission	IP Concern raised	Applicant's response
Baseline data	Boat-based data collection using AIS and radar was undertaken by Anatec in February and June 2017 which supplemented 2 months AIS data collection between December 2016 – February 2017. The NRA was reviewed by MCA in March 2018 and confirmed to be MGN543 compliant.	PLA made a number of representations that the NRA data used was unrepresentative and not compliant with MGN543. It was suggested that the timing of boat based surveys underestimated both AIS and non-AIS vessels (including recreational craft and fishing vessels) compared to 'peak' months of July and August.	The Applicant provided a review of the data used in the NRA against a year of AIS data, as well as additional fishing vessel data (REP4-030) This confirmed that the characterisation of shipping in the area in the NRA was consistent with this new data and was therefore robust and fit for purpose. These AIS vessel traffic figures corresponded very closely to those provided by PoT / LG, using data supplied by the PLA. The baseline data used in the NRA was confirmed as being compliant with MGN543 by MCA and as being representative of baseline conditions by MCA (REP6-013) and Trinity House (REP6-025) in their respective SoCGs. The baseline data, as reviewed in REP4-030, was confirmed as adequately characterising the receiving environment by Chamber of Shipping, Port of Tilbury and London Gateway in their relevant SoCGs. Equally the characterisation of recreational vessels in the area was agreed with the Royal Yachting Association (REP3-044) and Thanet Fishermen's Association agreed that the data used for identifying fishing vessels was the best available (REP024).

Topic	Applicant's submission	IP Concern raised	Applicant's response
Traffic growth assumptions	The NRA accounted for 10% growth in traffic numbers based on assumptions in the PLA's Thames Vision and the experience of Marico Marine.	Port of Tilbury and London Gateway stated that, based on their own assumptions for growth at their ports and based on the MMO Futures Analysis, that the 10% was incorrect and underrepresented the likely traffic growth.	The Applicant submitted a detailed review of historic data and future trends in marine vessel traffic numbers (REP7-026). This utilised vessel traffic data for the Port of London in comparison with the growth assumptions used by the IPs. It demonstrated that despite increase in freight tonnage into the Port of London, vessel numbers had remained static. There is a recognised trend to larger container vessels (DfT 2019) that confirms there is not a linear relationship between increases in gross tonnage and vessel numbers, as put forward by IPs. The analysis demonstrated that the DfT 2006 growth figures used in the Ports NPS and which underpin the MMO Futures analysis report (MMO 1127; MMO), used by IPs as evidence for this growth, significantly overestimated vessel traffic growth (which in fact decreased in the 10 years following that report) and could not be relied upon. It is also of note that the same Future Analysis report assumes that the trend for larger vessels would continue, and that minor changes to shipping routes will be made to accommodate offshore windfarms.

Topic	Applicant's submission	IP Concern raised	Applicant's response
Collision Risk Model (CRM)	A collision risk model was used by Marico Marine to assess potential increase in collision risk. The model is an extension of the peer reviewed Thames Traffic Model developed to test collision risk for the Port of London. The percent increases in collision risk were used to inform the inherent risk scores in the NRA.	The primary issue raised on the CRM was from PLA who considered the use of December 2016 AIS data, which was chosen to reflect poor metocean conditions, underrepresented marine traffic.	Following the introduction of the SEZ, further collision risk modelling was undertaken by Anatec (REP6-064). This was commissioned to test whether, as per IP comments, the modelling of a busier month of traffic would result in collision risk increases that would require reconsideration of the inherent risk scores. This CRM also provided an opportunity to assess the collision risk following introduction of the SEZ. This used their CRM which has been reviewed and accepted on multiple approved offshore wind DCOs with AIS data from September 2018. It demonstrated that the increase in collision was predicted to be very low (4%) and therefore the increases used in the NRA and NRAA were very precautionary.
Pilot Transfer Bridge Simulation (PTBS)	A PTBS was carried out in the PLA's simulator with mariner participation from PLA and ESL. The results of the simulation indicated that there was sufficient sea room to safely undertaken pilot transfers with the extension in place. These conclusions helped inform hazard risk scores.	PLA / ESL and PoT / LG raised concerns regarding the accuracy of the 2017 PTBS and the reliance on the outcomes in justifying the project risks to be ALARP. These IPs all considered that further simulation was required to determine the impact of the project.	In direct response to IP requests for a more extensive simulation, the Applicant undertook the 2019 PTBS. The results of the simulation confirmed that, in a wide range of 'limit state' conditions, there is sufficient sea room to safely undertake multiple pilot transfers.

Topic	Applicant's submission	IP Concern raised	Applicant's response
Hazard scoring	Calculation of baseline risk input scores in the NRA was based on the experience of master mariners and experts in Navigation Risk Assessments at Marico Marine, using established International Maritime Organisation (IMO) Formal Safety Assessment (FSA) methodology. This was benchmarked against national incident statistics from the MAIB database. Inherent risk input scores (i.e. those after the introduction of the project, before additional risk controls) were considered by Marico Marine, taking into account the increase in collision risk identified by the CRM, the results of the 2017 PTBS and their extensive professional maritime experience. The resulting hazard risk scores were calculated using the Marico Marine HAZMAN software, an approach consistently used by PLA and accepted on a wide number of marine infrastructure projects. These hazard scores were sent to MCA and TH for consultation, although no comments were received.	General concerns were raised by IPs regarding the scoring of hazards in the NRA and the lack of stakeholder input. However, the specifics of this issue were not further explored by IPs, for example by providing instances in the NRA hazard scoring log which were considered to be underscored (and a rationale for any increase), providing examples of other risk assessments which would contradict the approach taken or any evidence that baseline risks levels were at a higher level (i.e. through incident logs, concerns raised to industry forums etc.).	In order to address concerns regarding stakeholder input into the risk scoring, the Applicant held a hazard workshop following the introduction of the SEZ at Deadline 4, with all IPs in attendance (REP4B-005 to REP4B-008). In common with most such workshops, it was not possible to score every hazard on the day, however the top 4 hazards (as agreed at the outset with IPs) were discussed. The baseline and inherent risk scores for these hazards were agreed in the workshop (confirmed by MCA and TH in their respective SoCGs). The baseline risk scores were in fact marginally lower than those identified by Marico Marine in the original NRA. The inherent risk scores were higher than originally assessed, but still within ALARP. The only additional risk control to be proposed by IPs during the examination was undertaking AIS monitoring of the site (requested by Trinity House). The Applicant also committed to the provision of site specific meteorological data, an unimplemented risk control previously identified by the PLA in their own 2015 risk assessment of the North East spit.

Topic	Applicant's submission	IP Concern raised	Applicant's response
Sea room	The Applicant made a change to the Order Limits following Section 42 consultation in recognition of the concerns raised by stakeholders regarding the sea room available between the project and the Kent coast.	IPs raised concerns regarding the amount of sea room, initially proposing removal of the entire western extent of the wind farm, although little evidence was provided to support this. Consideration of whether a common ground could be reached was discussed during ISH5, to which most IPs agreed it could. The Applicant held a technical workshop on 27th February to inform a future boundary change, however IPs were unwilling to identify preferred boundary changes or areas of the 'inshore route' that were particularly sensitive.	The Applicant submitted a material change to the project in the form of a Structures Exclusion Zone. This significant amendment to the project boundary substantially increased sea room in the most heavily used areas of the inshore route. The rationale for this change is set out in REP4-014. The SEZ is secured by requirement in the dDCO and conditions in the dML. Following the introduction of the SEZ the Applicant, in response to IP feedback, amended the dDCO to exclude blade oversail from the SEZ.

Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex D - Point by Point response on DCO Matters

Submitted by Vattenfall Wind Power Ltd

Date: 31 January 2020

Revision A

Drafted By:	VWPL
Approved By:	Daniel Bates
Date of Approval:	January 2020
Revision:	A

Revision A	Original Document submitted to the Examining Authority
N/A	
N/A	
N/A	

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ID REF	Consultee comment	Applicant response
PLA-048	**DCO Art 16** The PLA remains of the view (as put forward by Trinity House in its D5A submissions [REP5A-006]) that it is neither necessary nor desirable to include a general power to suspend public rights of navigation in the dDCO. In the case of permanent structures, this suspension will last until that structure is decommissioned and permanently removed. The Applicant has given no compelling reason for the suspension of these public rights for such a long duration over an area which is a highly-used area by commercial, fishing and leisure traffic and which comprises key navigational routes into and from the Thames Estuary.	The Applicant would note that the provision in question is a model provision, and it has been included in multiple offshore wind farm projects. In practice its inclusion takes a *de facto* suspension of public rights of navigation (by virtue of having a structure in place) and formally and transparently suspends public rights of navigation within the DCO. The suspension is solely proposed at the location of foundation structures for the proposed infrastructure. In this context the compelling reason for suspension is the presence of a structure that would ordinarily make passage of vessels impossible.
PLA-049	**DCO Art 16** At Deadline 6, the ExA requested that the Applicant provide proposed relevant changes or an explanation as to why a change in drafting was not warranted in relation to navigation safety measures for temporary construction works. The Applicant's commentary does not appear to include a response to this comment from the Applicant, and the PLA and ESL remain concerned about navigation safety measures for temporary construction works.	The relevant commentary from the ExA reads: *'Port of Tilbury London Ltd., London Gateway Port Ltd. have requested [REP5A-001] that Art 16 be amended to extend the navigation safety measures for permanent structures to cover temporary construction works. It flags that similar measures enabling Trinity House to give directions for the lighting and marking of works are a standard provision in Ports DCOs and Harbour Orders. The Applicant is requested at Deadline 6 to either: a) Propose relevant changes; or b) Provide an explanation why such drafting is not warranted.'* The requirement for the Applicant to provide appropriate aids to navigation and marking as Trinity House direct from the commencement of construction is set out in condition 8 of Schedule 11 and condition 7 of Schedule 12. An aids to navigation management plan must be produced and complied with for the lifetime of the authorised scheme (condition 13(j)) of Schedule 11 and condition 11(k) of Schedule 12)). As Article 16 deals exclusively with the extinguishment of public rights of navigation for permanent structures, the requirement for aids to navigation during construction is secured appropriately in the dMLs.
PLA-050	**Sch 1 Parts 1 and 2** The PLA and ESL refer to their previous submissions on the dDCO. The Applicant states (Appendix 44 to Deadline 6 Submission: Applicant's response to commentary of dDCO from Interested Parties, p14) that the requirement to produce a construction programme and monitoring plan, as well as the requirement to submit a construction method statement to the Marine Management Organisation is more than sufficient to ensure complete clarity about the nature of the works and where they will be placed within the SEZ. There is, however, no clarity on the positioning of those works at this stage, and no party has had an opportunity to comment on the precise location of those works during the DCO process as the Applicant has not made that information available. There will be very limited oversight or approval of the nature of those works and where they will be, and the PLA and ESL will have no involvement in that process. The Applicant should be required to show the limits of the cabling works precisely on the works plans (through the DCO) – rather than the excessively large area covering the whole of the SEZ – in order to give Interested Parties and others certainty about the extent and location of those works.	It is established practice for offshore wind farm developments and associated electrical infrastructure developments such as the Triton Knoll Electrical System, to gain consent for development to occur within agreed Order limits that will inherently be greater than the immediate footprint to enable amongst other things siting around conservation features that may be ephemeral. It is a well-established process that precise locations of infrastructure are established and agreed post-consent, with developers being required to demonstrate that the final design and location of infrastructure is in accordance with the design and locations assessed within the Environmental Statement. Conditions requiring Construction Method Statements, and Design Plans to demonstrate compliance with the ES are entirely commonplace and accepted by the relevant regulatory authority (in this case the MMO). The established process is in part due to the recognised fact that final location and/or design of offshore infrastructure is dictated by a number of constraints which require further data, such as geotechnical and geophysical. The data in turn have an established 'shelf life' with statutory authorities requiring, for example, that data are no greater than 18 months old prior to construction. In this context it is not possible to define the cable layout within the Works Plans at this stage and instead a number of conditions have been agreed with the relevant regulatory authorities that enable the statutory and regulatory authorities (MMO and MCA) to have the necessary oversight and final approval of the works and layout.
MMO-051	**Fish Spawning:** The MMO notes the Secretary of State is considering inclusion of a new condition in respect of piling works, to mitigate the impacts of underwater noise on herring and sole spawning. The MMO supports the condition and related definitions as drafted and believe this will provide the necessary mitigation required, whilst providing means for variation, if appropriate.	The Applicant can confirm that further discussion and consultation has taken place between the MMO, its scientific advisers Cefas, and the Applicant. The MMO have confirmed that the further information provided adequately meets the MMO's requests. The MMO have also confirmed that the condition initially proposed by the Secretary of State can now be amended to only reference a seasonal restriction for the Downs herring stock (1st November to 31st January inclusive), with agreement that restrictions for sole and Thames herring stock are no longer relevant.
MMO-052	Saltmarsh Mitigation: The MMO supports the inclusion of Requirement 13 with regard to the Saltmarsh Mitigation, Reinstatement and Monitoring Plan however advises this should also be included as a condition on the deemed Marine Licence (dML).	In broad terms, subject to the requests made by the Applicant within its previous submission, the Applicant is also content with the proposed wording. In short the Applicant's reservations regarding the suggestion of combining the plover mitigation and saltmarsh reinstatement plans remain, as there is duplication with existing conditions, but the Applicant is content to accept the proposed changes if the Secretary of State considers it necessary to include them.
MMO-053	Saltmarsh falls within the intertidal zone and as such under the MMO's regulatory remit, though it is acknowledged this area is also subject to terrestrial consents. If the DCO is consented the MMO can only enforce conditions that are included on the dML.	

ID REF	Consultee comment	Applicant response
MMO-054	Please note that the condition on the dML should provide for approval of the Plan by the MMO in consultation with Natural England and should fall within appropriate parameters for approval – e.g. as provided for in Schedule 11, condition 15, unless otherwise agreed by the MMO.	
MMO-055	The MMO understands Natural England are equally supportive of inclusion of a relevant condition on the dML and defer to their expertise on appropriateness of the wording in addressing their prior representations.	
MCA-008	Draft Development Consent Order (DCO): The MCA has considered the DCO/DML and we would like to highlight the following aspects which are not in line with the MCA, Trinity House and the Marine Management Organisation's (MMO) agreed navigation safety conditions for offshore renewable energy installations (changes requested are shown in italics) :	The Applicant has responded to specific points below.
MCA-009	Notifications and Inspection (Page 100): (8) The MCA would expect: "A notice to mariners must be issued at least 14 days prior to the commencement of the licensed activities or any part of them advising of the start date…….	The Applicant can confirm that it has no objection to the condition being amended in this way.
MCA-010	(12)The MCA would expect: "In case of exposure of cables on or above the seabed, the undertaker must within three days following the receipt by the undertaker of the final survey report from the periodic burial survey, notify mariners by issuing a notice to mariners and by informing Kingfisher Information Service of the location and extent of exposure. Copies of all notices must be provided to the MMO, MCA, Trinity House, and the UKHO within 5 days.	The Applicant can confirm that it has no objection to the condition being amended in this way.
MCA-011	Pre-construction plans and documentation (Page 103): 13-(1) The MCA would expect: "The authorised project shall not commence until the following have been submitted to and approved by the MMO. Each programme, statement, plan, protocol, scheme or other detail required to be approved under this condition must be submitted to the MMO for approval at least 6 months prior to the commencement of the authorised project except where otherwise stated.	The Applicant can confirm that in line with previous submissions made in writing and orally, submission of pre-construction plans and documentation 6 months prior to commencement is not considered reasonable. The Applicant notes that 6 months is not in line with the submission timescales for other offshore wind farm projects, and current marine infrastructure DCOs such as Tilbury2. As such the Applicant requests that that the reference to 4 months be retained.
MCA-012	15-(7) The MCA would expect the following: No part of the authorised project may commence until the MMO, in consultation with the MCA, has confirmed in writing that the undertaker has taken into account and, so far as is applicable to that stage of the project, adequately addressed all MCA recommendations as appropriate to the authorised project contained within MGN543 "Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response Issues" and its annexes.	The Applicant can confirm that it has no objection to the condition being amended in this way.
MCA-013	Pre-construction plans and documentation (page 124): The MCA would expect the following to be included in the condition: (ii) a detailed cable laying plan for the Order limits, incorporating a burial risk assessment encompassing the identification of any cable protection that exceeds 5% of navigable depth referenced to chart datum and, in the event that any area of cable protection exceeding 5% of navigable depth is identified, details of any steps (to be determined following consultation with the MCA and Trinity House) to be taken to ensure existing and future safe navigation is not compromised or such similar assessment to ascertain suitable burial depths and cable laying techniques, including cable protection; and	In principle the Applicant has no objection with the suggested condition but would note that as these commitments are already made and secured in existing certified documents (such as the ES and Schedule of Mitigation) it is not necessary to explicitly reference this requirement in the DML.
MCA-014	Pre Construction Monitoring and Surveys (page 106): 16.b The MCA would expect the following to be included in the condition – in line with MCA published hydrographic survey guidelines: A swathe bathymetric survey to IHO Order 1a, of the area(s) within the Offshore Order limits in which it is proposed to carry out construction works and disposal activities, extending to a 500 metre buffer around the site of each work must be undertaken. The survey shall include all proposed cable routes.	The Applicant can confirm that the existing condition is in line with published hydrographic survey guidelines but would note that the current condition provides all parties with flexibility to determine appropriate buffers. By way of context agreement on appropriate buffer distance post-consent is common place on all offshore windfarms, and the Applicant would note that the existing wording has been agreed with the MMO as lead authority for the deemed Marine Licence.

ID REF	Consultee comment	Applicant response
MCA-015	This should fulfil the requirements of MGN 543 and its supporting 'Hydrographic Guidelines for Offshore Developers', which includes the requirement for the full density data and reports to be delivered to the MCA and the UKHO for the update of nautical charts and publications. This must be submitted as soon as possible, and no later than [three months] prior to construction. The Report of Survey must also be sent to the MMO.	Please see response to MCA-012.
MCA-016	Post construction (page 107): The MCA would expect the following to be included in the conditions as per MGN 543 Hydrographic Survey Guidelines: The undertaker must conduct a swathe bathymetric survey to IHO Order 1a of the installed export cable route and provide the data and survey report(s) to the MCA and UKHO. The MMO should be notified once this has been done, with a copy of the Report of Survey also sent to the MMO.	See response to MCA-014
MCA-017	On post decommissioning, the undertaker must conduct a swathe bathymetric survey to IHO Order 1a of the cable route and the area extending to 500m from the installed generating assets area and provide the data and survey report(s) to the MCA and UKHO.	See response to MCA-014
MCA-018	This should fulfil the requirements of MGN 543 and its supporting 'Post Construction Hydrographic Guidelines for Offshore Developers, which includes the requirement for the full density data and reports to be delivered to the MCA and the UKHO for the update of nautical charts and publications.	Please see response to MCA-012
NE-001	Draft Development Consent Order (Point 5): Schedule 11, Part 4, Condition 24 and Schedule 12, Part 4, Condition 27 – Natural England notes the addition of point (4). Currently as this point is written, it could imply that the documentation needs to be submitted 4 months prior to any licensed activities and not the pre- commencement activities. We suggest wording should be amended to state that documentation needs to be submitted 4 months prior to any pre-commencement activities.	The Applicant has no objection to Natural England's proposal.
NE-002	Secondly, we note this does not resolve the issues Natural England has previously raised regarding the proposed approach and the drafting of the definition of offshore commencement to move potentially damaging works to pre-commencement. This approach still requires additional sign off and further work by the regulators and relevant consultees. This work will likely need to be repeated and reviewed when further documentation is submitted prior to construction. The cost of which will be mostly born on the public purse, as many of the statutory bodies involved cannot recover the costs for this statutory work. Furthermore, it does not achieve the aim of the developer which is to allow these works to commence earlier than construction activities. This is due to the issues that are likely to be encountered regarding the timing of pre-construction monitoring and the detail needed to inform any mitigation. This information is unlikely to be available significantly before the works commence.	The Applicant recognises Natural England's concerns, and can confirm that where feasible submissions of pre-commencement documentation will be aligned in order to minimise the number of iterations. It is not however possible to align all pre-commencement submissions (i.e. combining all pre-commencement and pre-construction submissions) as they are inherently iterative, i.e. pre-commencement works are under some circumstances required to inform pre-construction activities. The Applicant notes Natural England's view on the likelihood of pre-commencement works being undertaken under the definition in the DCO, however it considers the wording to offer valuable flexibility to structuring its construction programme without undue burden on statutory bodies, as such works would simply be being brought forward, not being duplicated, therefore the approvals would be required at one stage or another.
NE-006	Saltmarsh Mitigation: Overall, Natural England is content with the additional text suggested by the SoS. Part (2) will allow the Saltmarsh Mitigation Plan (SMP) to be sufficiently updated following the final decision regarding the final export cable route and landfall methodology. Further still, part (3) ensures that disturbance to ringed plover is prevented by including additional measures in the SMP.	As per the Applicant's original response to the Secretary of State there is a risk of confusion with the proposed wording that can be avoided by ensuring the plover and saltmarsh plans are dealt with by separate conditions. The Applicant also notes that following discussion with Natural England it is understood that Natural England and the Environment Agency also agree with the Applicant's position stated within the original response and will be submitting revised positions.
NE-007	However, there needs to a time period stated within the condition to ensure the updated SMP is submitted with enough time for the relevant parties to review it effectively. The condition should state that the plans will be submitted at least 4 months prior to any proposed works within the saltmarsh. If added to the DCO/DML, the conditions should also be added to the overarching pre-construction documentation condition which would link the requirements to the overarching timeframe of submission, 4 months prior to the commencement of construction.	The Applicant recognises and supports the need to submit the plan 4 months before any proposed works in the saltmarsh and can confirm that this timeframe is agreeable for all pre-construction/pre-commencement documentation.